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Official Journal of the Interstate Postgraduate Medical Association

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Postgraduate Medicine

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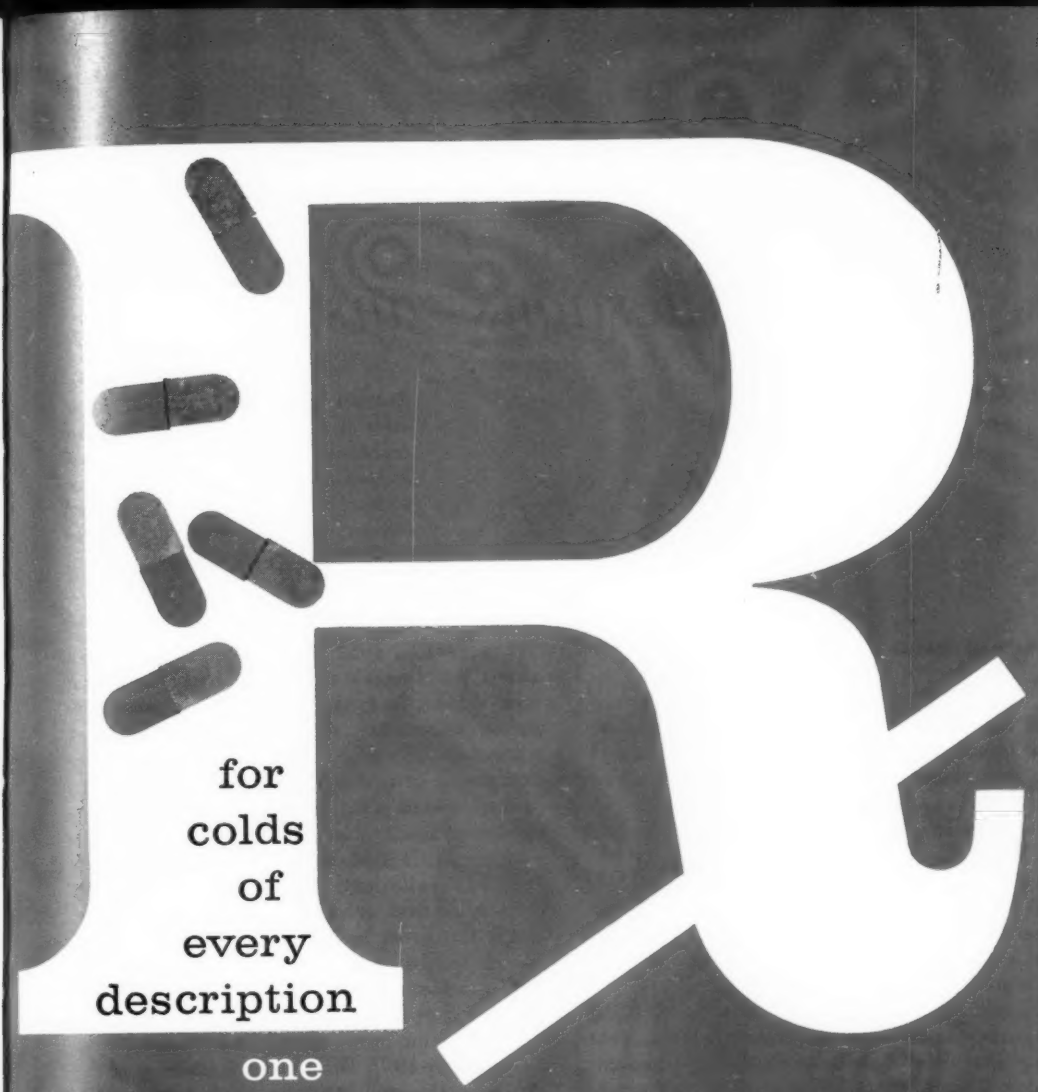

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Your Questions answered

Readers may send questions from their own practice or other medical problems which will be answered by qualified consultants. Replies are forwarded by mail immediately and selected questions and answers are published each month in this section.

• GERMAN MEASLES IN PREGNANCY

Q. A patient, aged 25, is pregnant for the second time. Her last normal menstrual period began January 21. On March 4, she broke out with the rash characteristic of German measles; this diagnosis was confirmed by a specialist in internal medicine. When seen by an obstetrician on March 25, she was believed to be eight weeks pregnant.

Knowing the significance of having German measles during the first trimester of pregnancy, she wishes to have a therapeutic abortion. She is in good health and fertile.

Should a therapeutic abortion be done? If the pregnancy is allowed to continue to term, what congenital defects are most likely to be encountered? What likelihood is there that a spontaneous abortion will occur, and at what time in the pregnancy would it most likely take place?

M.D.—Minnesota

A. In 1942, Gregg of Australia first reported the high incidence of congenital cataracts and congenital heart disease in babies born of mothers who had rubella in the first trimester of pregnancy. Since that time, an increasing number of reports indicate that the danger of congenital malformations occurring in babies born under these circumstances is considerably less than was first thought. At the present time, the consensus is that congenital defects occur in approximately 15 per cent of cases.

The following is a quotation from an editorial in the *New England Journal of Medicine*, volume 247, page 132, 1952: ". . . Yet, even 10 years after the teratogenic capacities of the virus have been established, the precise risk cannot be stated—so rare are cases among adult females at a selected stage of gestation, so variable are the expressions of maternal infection in the infant, so cumbersome is the task of case finding, follow-up study, classification of defect, and centralization of data. It is doubtful, however, that the risk of serious malformation is more than 15 per cent even at the first, crucial trimester of pregnancy, and it may prove less. . . . No physician is justified in stating categorically that rubella in the first trimester of pregnancy is always associated with a bad prognosis."

At a meeting of the American Gynecologic Society in May 1957, Dr. Charles A. Behney of the Michigan Department of Health in Lansing discussed 55 patients who had been diagnosed by physicians as having rubella. Of the 35 patients who had had the disease during the first trimester of pregnancy, only four gave birth to children with congenital defects. One infant had hypospadias, one had syndactylia, a third had congenital cataract and heart disease, and a fourth had congenital cataracts and heart disease, hypospadias, undescended testicle and equinovarus. The occurrence of congenital anomalies in this small group is approximately 15 per cent.

In summary, therefore, it would seem that the risk is not nearly as great as was originally thought, and most authorities now believe that interrupting pregnancy because congenital defects may occur is unjustifiable.

(Continued on page A-20)

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*Finnerty, F. A. Jr.: New York State J. Med. 57:2957 (Sept. 15) 1957.

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• MOVING INJURED PATIENT

Q. What is the best way to move an unconscious patient who has a spinal injury if the site of the injury cannot be determined?

M.D.—Nova Scotia

A. When the exact site of the injury cannot be determined, the patient should be placed flat on his back with his head aligned with his spine. If he is unconscious and in shock, it is often advantageous to elevate his feet slightly to facilitate removal of secretions and to combat hypotension. The litter should be sufficiently firm to maintain the spine alignment without flexion or extension. Although a prone position is often considered good, it is difficult for the patient to breathe when his head is turned face down to align the spine correctly. Since it is important that alignment be maintained until the area of injury can be determined, the supine position is preferred.

• LOCAL CEREBRAL ISCHEMIA

Q. A 69 year old man became ill while working in his yard. After resting in bed, he had difficulty in walking. His temperature was 97° F., pulse 72, and blood pressure 176/92. I prescribed SERPASIL®, 0.1 mg. three times a day after meals. The following day the right side of his face and both his left arm and leg were paralyzed. His temperature was 97° F., pulse 76 and blood pressure 210/104. His heart and lungs were normal on both days. I placed him on a low salt diet and prescribed 0.25 mg. of Serpasil to be taken twice a day.

On the third day, his temperature was 97° F., pulse 72, blood pressure 204/76 and his heart and lungs were normal. His facial appearance was somewhat improved and he had slight control of his limbs. I increased the Serpasil to three times a day. Since he was very restless, he was given one-half grain of phenobarbital three times a day and one NOLUDAR® tablet at bedtime. What treatment would you suggest to reduce the blood pressure? How soon can massage be started?

M.D.—Michigan

A. In a 69 year old man the elevated blood pressures which are quoted indicate a hypertension which is chiefly systolic and associated with considerable widespread arteriosclerosis and rigidity of the arterial tree. Reduction of the blood pressure by means of antihypertensive drugs may be difficult and is of doubtful value in the treatment or prevention of local cerebral ischemia. The use of ganglion-blocking agents is probably contraindicated. Hydralazine will probably be ineffective. Small doses of one of the *Rauwolfia* compounds could be continued, but the patient should be kept under close observation, and if signs of mental depression develop, the *Rauwolfia* compound should be discontinued. Chlorothiazide in doses of 500 mg. two or three times a day may, in itself, have some effect in lowering the blood pressure and may also enhance the effect of the *Rauwolfia* compound. The combination of right facial and left arm and leg paralysis in a patient such as this is almost certainly due to local cerebral ischemia or transient cerebral infarction in the region of the brain stem, and is probably associated with thrombosis in one of the branches of the basilar arterial system. Long-term anticoagulant therapy is probably not indicated after one such episode, but if any subsequent clinical evidence of cerebral ischemia or cerebral infarction develops, such therapy should be instituted as soon as possible after the clinical manifestations begin. Massage and muscle training should be instituted as soon as there is evidence of some recovery of function in the arm and leg.

• VITAMIN A INTOXICATION

Q. Is there any possibility that vitamin A therapy will produce a state of intoxication, manifested by intracranial changes or other signs?

M.D.—Michigan

A. The continued use of excessive amounts of vitamin A, especially in children, may produce roughening of the skin, irritability, coarsening and falling of the hair, anorexia, loss of weight, headache, vertigo, hyperesthesia, splenomegaly, tenderness over the long bones, and hyperlipoidemia. It occasionally causes hepatomegaly and, rarely, hemorrhage, which is due to hypoprothrombinemia.

Because of the large margin of safety between an active therapeutic dosage and toxic quantities of vitamin A, intoxication is relatively rare. The prolonged daily ingestion of 160,000 to 180,000 I.U. or more of vitamin A has resulted in a picture of toxicity.

Hypervitaminosis subsides two to three months after vitamin A therapy is discontinued.

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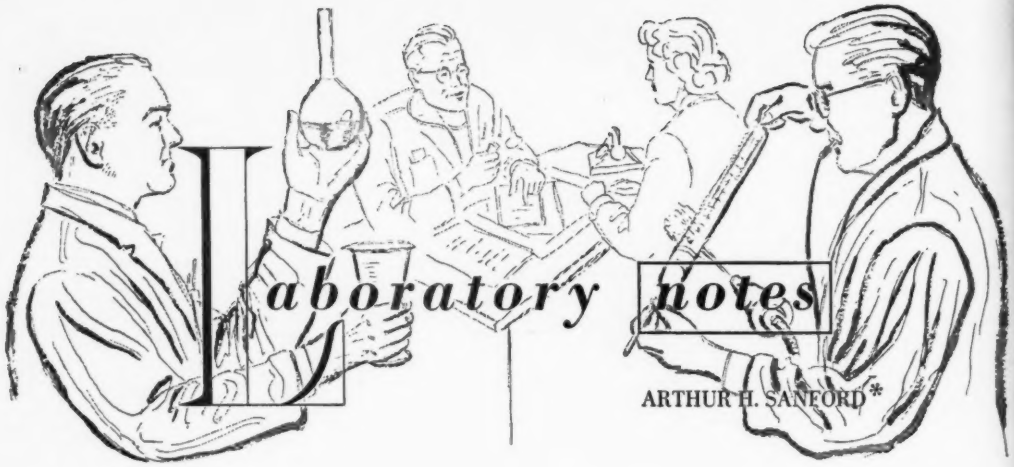

ARTHUR H. SANFORD*

I am sure that the readers of this column will find of interest this comprehensive chart and descriptive article on hematuria. The chart first attracted my attention when it was exhibited at the meeting of the Minnesota State Medical Association at Minneapolis in May 1958. I am indeed grateful to Drs. Webb, Smith and Price for supplying this material.—Arthur H. Sanford, M.D.

Hematuria

EDGAR A. WEBB, BAXTER A. SMITH AND WILLIAM E. PRICE

Minneapolis

HEMATURIA is a symptom and a sign, but it should not be construed as a diagnosis! When hematuria clears spontaneously or coincidently with the administration of medication, it *does not* mean the underlying process has resolved. However, when the cause is uncomplicated infection, the condition may be cured.

Gross hematuria demands a definitive diagnosis. In obtaining a pertinent history of hematuria, the physician should attempt to determine the following:

1. Abruptness of onset and amount of blood.
2. Presence of associated pain (colic), the side involved, and whether pain preceded or followed the hematuria.
3. History of previous episodes and intervals between occurrences.
4. Character of hematuria; that is, whether it is:
   a. Initial—at the beginning of urination, followed by grossly clear urine.
   b. Mixed or total hematuria.
   c. Terminal—clear urine followed by hematuria at the end of micturition.
5. Whether there is difficulty in voiding; presence of clots (size and appearance) and associated vesical irritation: frequency, dysuria, urgency, strangury.
6. Whether blood is actually seen as urine passes, or if it is noted in the bowl, on clothing, on toilet tissue, or in ejaculum.

(Continued on page A-28)

*Emeritus Staff, Section of Clinical Pathology, Mayo Clinic; Director of Laboratories, Rochester State Hospital, Rochester, Minnesota.

throughout the practice of medicine . . .

anxiety

either alone or complicating physical illness

General Practice
Pediatric Psychiatry
Metabolic Disorders
The Neuroses
Neurology
Neuromuscular Disorders
General Surgery
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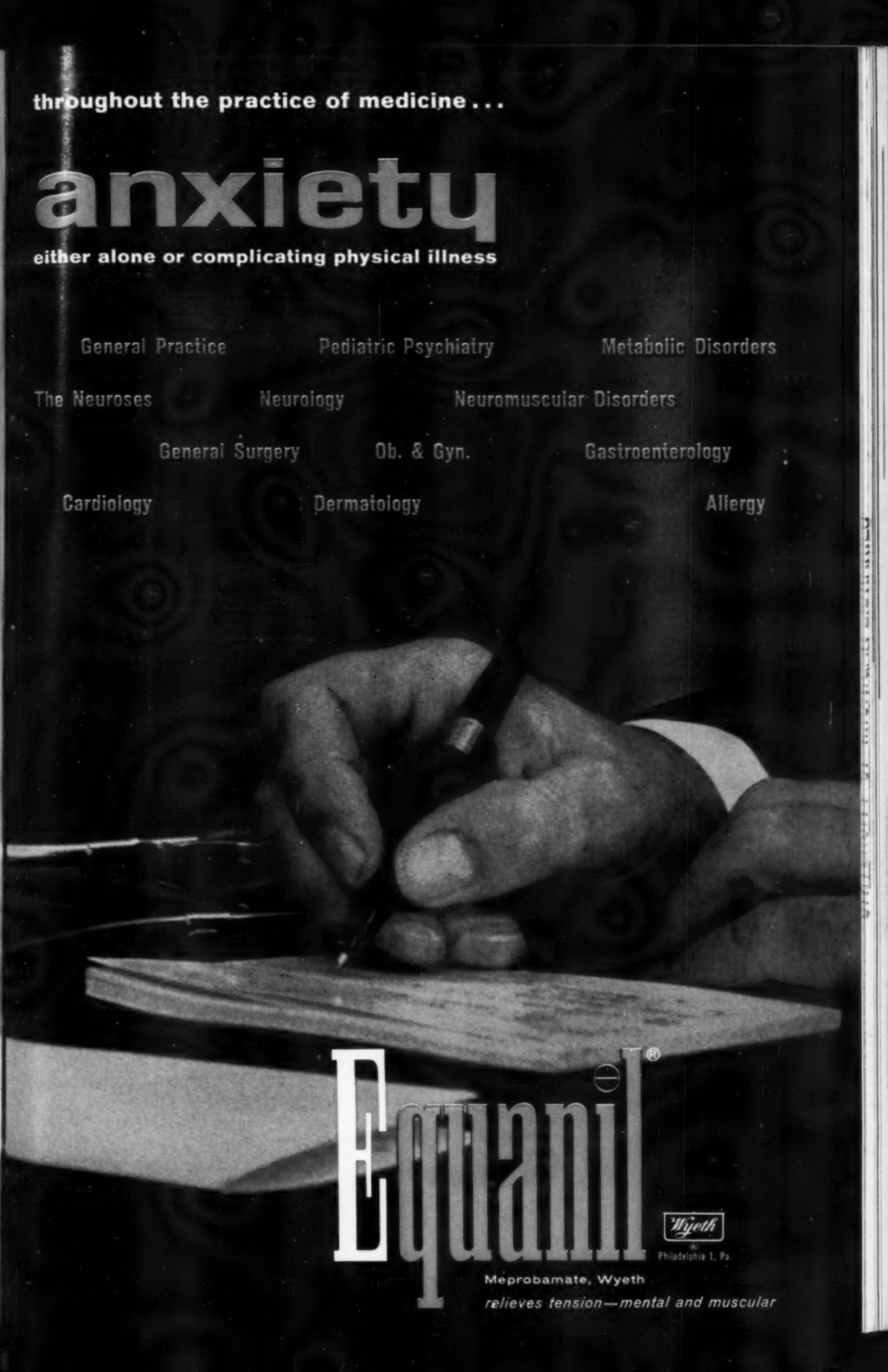
Allergy



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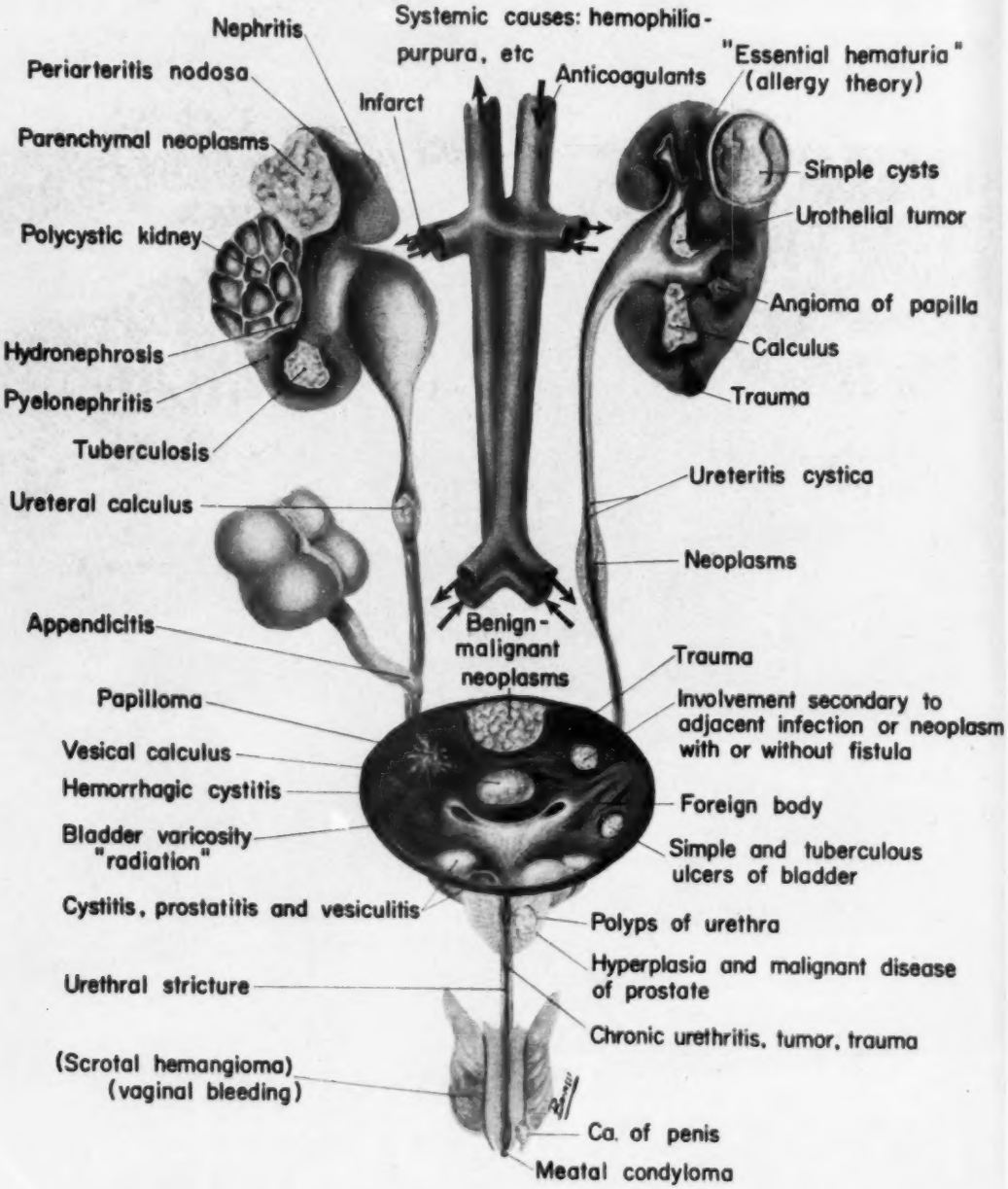
COMMON SOURCES OF HEMATURIA



7. Presence of associated symptoms: abdominal pain, diarrhea, constipation, menses, trauma (type), etc.
8. Present and past general history, such as fibrillation, tuberculosis, blood dyscrasia, occupation, places of residence, etc.

Local examination should include careful abdominal, external genital and urethral inspection and palpation. Rectal and bimanual examination in a man, and pelvic and speculum examination in a woman are essential.

Findings of the microscopic examination of a woman's voided urine are of value only if they are negative. This rule has but few exceptions. A man's urine usually should be obtained as a two-glass specimen. Red cells may be crenated or laked.

Upper urinary tract bleeding is usually mixed or total hematuria. The color may be bright red, dark or coffee-brown. The last-mentioned color is due to acid heme. Colic indicates ureteral obstruction. Ureteral clots are typically worm-shaped. Vesical bleeding also is usually mixed; however, at times, it may be terminal, and it usually occurs at the onset of acute hemorrhagic cystitis. Hematuria of prostatic origin may be initial or terminal, or mixed if blood refluxes into the bladder. Massive bleeding with clots and, perhaps, clot retention usually arises from the bladder or prostate. Bleeding noted only on the clothing or toilet tissue may be urethral (occurring especially from the meatus in both men and women), penile, scrotal (small hemangioma) or vaginal. Uterine carcinoma rather than hematuria is frequently found. When rectal examination reveals no abnormalities, bloody ejaculum is called "urologic nosebleed."

The investigation of hematuria ordinarily should begin with excretory urography, which demonstrates renal function as well as morphologic findings. Cystoscopy is necessary to exclude the bladder as a source of hematuria, since this cannot be determined by a normal-appearing cystogram. The vesical neck and the entire urethra (either male or female) are inspected at the same time; a forward-looking instrument is essential for the examination. Retrograde pyelography and angiography or renal needle biopsy are done as indicated. Urine may be stained for tumor cells.

If it is feasible, it is advantageous to perform a cystoscopic examination during bleeding, since ureteral spurts may be visualized. Anesthesia is necessary if marked vesical irritation is present or if the prostate is large.

Microscopic hematuria without symptoms also warrants investigation. Greene, O'Shaughnessy and Hendricks[1] found lesions of various significance in the urinary tract of 10 per cent of 500 patients with asymptomatic microhematuria. Excretory urography and cystoscopy were the advised investigations, tempered, perhaps, to examination of the kidney, ureter and bladder, and cystoscopy if the patient was less than 50 years of age. All serious lesions found in this series were in patients more than 50 years old.

Hematuria is a symptom or a sign, not a diagnosis. Hematuria demands investigation.

REFERENCE

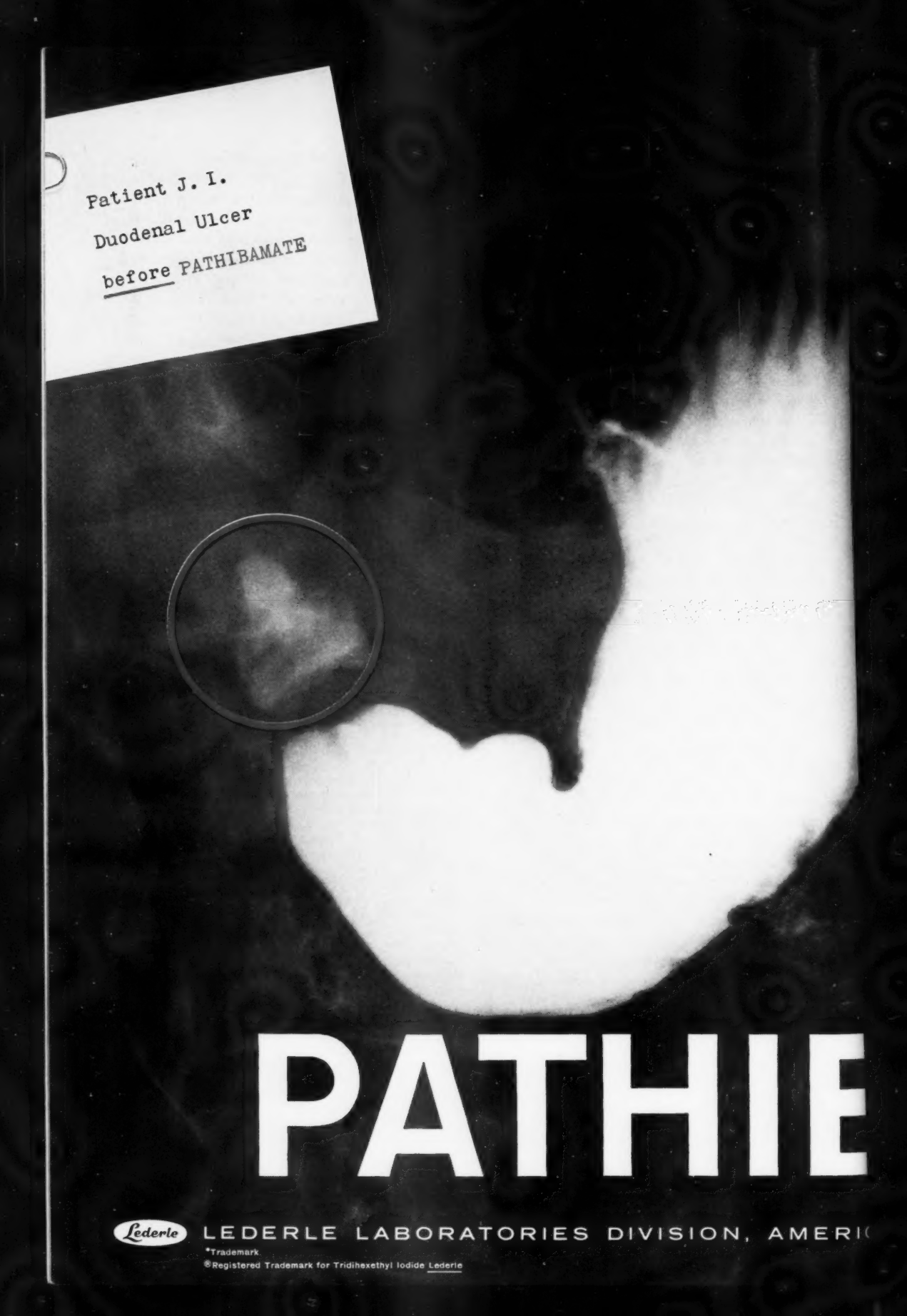
1. Greene, L. F., O'Shaughnessy, E. J. and Hendricks, E. D.: Study of 500 patients with asymptomatic microhematuria. J.A.M.A. 161:610-613 (June 16) 1956.

MEETINGS and Postgraduate Courses

Albany Medical College, Albany: Postgraduate courses for 1959:

Two-way radio conferences, January 6-May 1
Medical seminar cruise, January 7-23
Acute and chronic pyelonephritis, January 15
Surgical anatomy—dissection of thorax, January 20-February 3
Prophylactic use of antibiotics, January 22
Recent advances in endocrinology, January 29
Recent advances in diagnosis and management of heart disease, February 5
Surgical anatomy—dissection of abdomen, February 10-March 17
Recent advances in surgery, February 12
Recent advances in medicine, February 19
Recent advances in obstetrics and gynecology, February 26-March 19
Surgical anatomy—dissection of lower extremity, March 24-April 21
Pediatric refresher course, March 26-April 30
Clinical correlation of electrocardiograms with disease process (hospitalized patients), to be individually arranged
Clinical refresher course, to be individually arranged

For further information, write to: Dr. Frank M. Woolsey, Jr., Associate Dean and Director of Postgraduate Medical Education, Albany Medical College, Albany.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What's happening in Medicine ?

POSTGRADUATE MEDICINE'S REPORT of late news of interest to practicing physicians

HYPOTHERMIA WITH INTRAGASTRIC COOLING

Clinical Congress, American College of Surgeons:

- An intragastric balloon combined with thermic blankets to produce hypothermia in 13 patients changed body temperature more rapidly and accurately than blankets alone.—Dr. F. John Lewis, Northwestern University Medical School, Chicago.
- Prolonged treatment with antithyroid compounds and radioiodine produced cancer in hamsters for the first time. The cancers are particularly interesting since they seem to have been induced by an iodine deficiency, and metastases occurred only in females.—Dr. Joseph G. Fortner, Sloan-Kettering Institute, New York.
- A review of 350 infants and children with ventricular septal defects seen in the last 10 years indicates that only those patients with large defects and symptoms associated with pulmonary hypertension and large left-to-right shunts should be operated on at present. Until technical improvements can insure a lower mortality and permanent closure, surgery in children with smaller defects and no symptoms may be deferred.—Dr. Milton Weinberg, Presbyterian Hospital, Chicago.
- Although nitrogen mustard produces biologic effects similar in many respects to those produced by radiation, the drug is not carcinogenic when given to animals in a manner similar to that used clinically as a surgical adjuvant.—Dr. Gerald McDonald, University of Illinois College of Medicine, Chicago.

RADIOLOGISTS' LIFE EXPECTANCY NORMAL

Second United National International Conference on the Peaceful Uses of Atomic Energy:

- Radiologists as a group have a life expectancy comparable to that of other medical specialists. A survey of records from 1897 to 1921 including those on radiologists shows no evidence of any current reduction in life span. This finding conflicts with the 1956 report of the National Academy of Science which showed the average age of death of American radiologists to be five years less than that of other physicians.—Dr. W. M. Court Brown, London, England.
- The first five year results of routine intraperitoneal (and intrapleural) administration of colloidal radioactive gold for treating ovarian cancer in a group of 51 patients show a doubling of salvage rate in patients with surgically resectable cancer in the primary stage. Early macroscopically invisible microdissemination of cancer cells throughout the abdominal cavity occurs in about 50 per cent of operable cases.—Dr. J. H. Muller, University of Zurich, Zurich, Switzerland.

Curable homosexuality

American Psychological Association, annual meeting:

- Rational psychotherapy can change a person with a deviated pattern of homosexuality into a "virtually 100 per cent heterosexually oriented individual." Rational psychotherapy contends that the patient bolsters his irrational beliefs by continually reindoctrinating himself with his nonsensical philosophies. Depropagandization is taught by the therapist.—Albert Ellis, New York.
- Interviews with 92 men and 134 women showed relaxation to be the most consistent satisfaction gained from smoking; "something to do" was next most frequently mentioned. On further probing, it was found smokers specifically wanted something to do with their hands and, perhaps less frequently, with their mouths. Social poise and stimulation were other satisfactions gained.—Daniel S. P. Schubert, University of Chicago, Chicago.

Proteins and arthritis

American Chemical Society, national meeting:

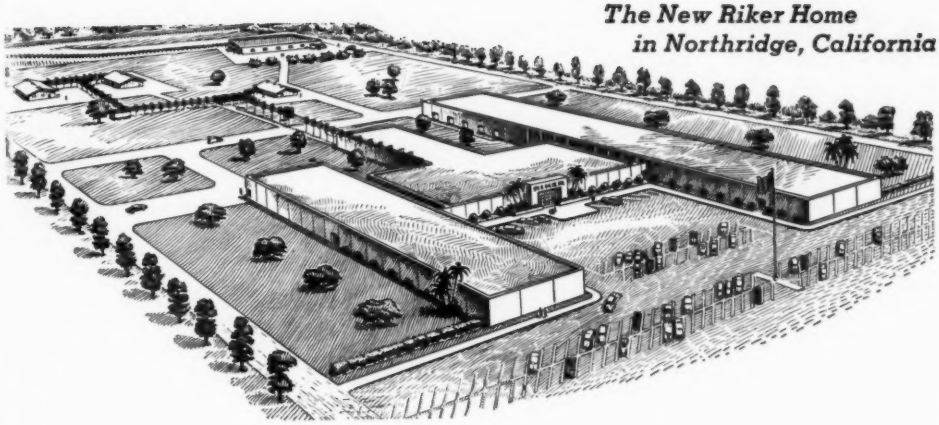
- Blood samples from patients with rheumatoid arthritis show a rheumatoid factor (R.F.) that is composed of several related proteins. The three proteins identified resemble some of the unusual ones associated with such diseases as hepatitis, syphilis and certain anemias. They also seem related structurally to serum antibodies. The R.F. proteins may be auto-immune bodies.—Dr. Ralph Heimer, Hospital for Special Surgery, New York.
- The hypotensive action of reserpine has been split off from its tranquilizing effect. The new hypotensive agent methyl carbethoxysyringoyl reserpate has one-fourth the tranquilizing effect of reserpine but only one-fortieth its hypotensive action.—H. B. MacPhillamy, Ciba Pharmaceutical Products, Inc., Summit, N. J.
- A new group of synthetic compounds, sulfonyl hydrazones, are more effective against staphylococcal and streptococcal organisms than the sulfonamides.—Benjamin H. Gross, Chattem Chemicals, Chattanooga, Tenn.

Monitoring surgery

Michigan State Medical Society, annual meeting:

- Miniature electronic equipment now offers great advantages to anesthesiologists. Available are electrocardiograph monitors having transistors, which will fit in a breast pocket and audibly signal each heart beat; they use flashlight-sized batteries and have only two skin leads. Pulse monitors, strapped to a finger, signal the presence of adequate blood pressure and may replace the stethoscope for measuring pressure. Ventilators have been designed to permit observation of actual tidal volume. The increasing simplicity of some of these safety devices is a strong argument for their use in routine anesthesia practice.—Dr. John W. Severinghaus, San Francisco.
- Children with ulcerative colitis can be divided into two groups from the standpoint of personality. The most common type is a rigid, compulsive, perfectionistic and highly intellectual youngster who expresses little emotion. Less common is the manipulative, egocentric and emotionally unstable child who tends to use and abuse his colitis to gain his own ends. The former usually has more severe bouts of colitis, but is easier to treat psychiatrically than the latter, who shows less dramatic physical symptoms.—Dr. Stuart M. Finch, Children's Psychiatric Hospital, University of Michigan, Ann Arbor.
- There is overwhelming evidence that the true potential of partial nephrectomy has not been realized. Serious sequelae can be avoided by proper precautionary measures.—Dr. Ormond S. Culp, Rochester, Minn.

The New Riker Home
in Northridge, California



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a totally new molecule for the treatment of mild mental depression, fatigue, chronic headache, and psychoneuroses, as well as behavior and learning problems of children; distinguished for its freedom from pressor activity, skeletal muscle stimulation and other side actions.

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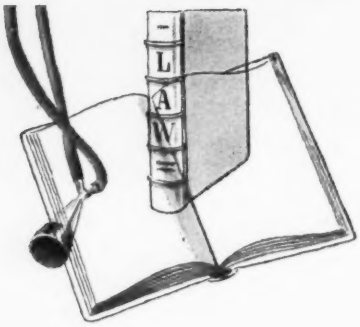

Forensic Medicine

What's New in Medical Jurisprudence

HERMAN WING*

Massachusetts General Hospital, Boston

IT is a great privilege for a young man to speak of new ideas in any subject. Usually, trends and tides are discussed by our elders who have had years of experience. However, the unexplored vastness of legal medicine is wide open for all pioneers and explorers.

HERMAN WING

I wish to dedicate this presentation to my wonderful friend and the past president of the American Academy of Forensic Sciences, the late Louis J. Regan, M.D., LL.B., former counsel of Los Angeles Medical Society, who encouraged me to study law and to continue to keep abreast of medicine and helped me during many trying times to accomplish these objectives.

What is meant by medical jurisprudence, forensic science or legal medicine? It is that branch of knowledge which applies the science of medicine and the paramedical sciences to the service and administration of the law.

The common area occupied by medicine and law is enlarging as the society in which we live becomes more complex and technological.

Medicine deals fundamentally with the human body and the reaction of its intricate parts to the forces of nature acting within and without the body. The law deals primarily with relationships between individuals or groups of people. These relationships, created by man himself, have their precedents in historical custom or mores, in legislative action, and in decisions and interpretations of quasi-judicial administrative bodies and courts.

To simplify the subject matter of medical jurisprudence, let me offer an outline I use for teaching as well as for cataloguing information about legal medicine (table 1). Other speakers at this meeting previously have covered most of the important topics in this outline, but some recent developments in the category of insurance and civil law deserve comment.

Personal Injury

The medicolegal area of greatest interest in terms of numbers of people concerned, and

(Continued on page A-52)

*Department of Physical Medicine and Rehabilitation, Massachusetts General Hospital, Boston, Massachusetts; member, American Medical Association and American Bar Association.

Presented at the tenth annual meeting of the American Academy of Forensic Sciences at Cleveland.

new

Tao*

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(brand of triacetyloleandomycin with glucosamine)

Capsules / Oral Suspension

designed for effective control of common gram-positive infections

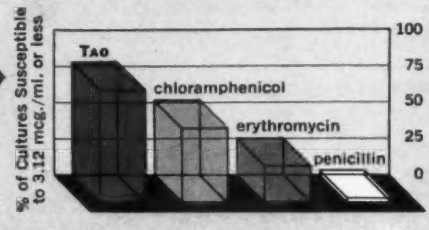
effective . . .

CLINICAL RESULTS	adults	children	all Staph infections
Cured	172 (80%)	148 (89%)	71 (88%)
Improved	28 (13%)	8 (5%)	7 (9%)
Failure	17 (7%)	11 (6%)	3 (3%)

Types of infecting organisms: The majority of identified etiologic microorganisms were Staph. aureus and Staph. albus. Tao has its greatest usefulness against organisms such as: staphylococci (including strains resistant to other antibiotics), streptococci (beta-hemolytic strains, alpha-hemolytic strains and enterococci), pneumococci, gonococci, Hemophilus influenzae.

even against resistant staph[1,2] . . .

Per cent of "antibiotic-resistant" epidemic staphylococci cultures susceptible to Tao, erythromycin, penicillin and chloramphenicol.[1]



well tolerated . . .

REACTIONS:

(a) adults	(b) children
Total—9.2% (20 out of 217)	Total—0.6% (1 out of 167)
Skin rash—1.4% (3 out of 217)	Skin rash—none
Gastrointestinal—7.8% (17 out of 217)	Gastrointestinal—0.6% (1 out of 167)

There was complete freedom from adverse reactions in 94.5% of all patients. Side effects in the other 5.5% were usually mild and seldom required discontinuance of therapy.

[illegible] . . . stability in gastric acid • rapid, high and sustained blood levels • high urinary concentrations • outstanding palatability in a liquid preparation

Dosage and Administration: Dosage varies according to the severity of the infection. For adults, the average dose is 250 mg. q.i.d.; to 500 mg. q.i.d. in more severe infections. For children 8 months to 8 years of age, a daily dose of approximately 30 mg./Kg. body weight in divided doses has been found effective. Since Tao is therapeutically stable in gastric acid, it may be administered at any time, without regard to meals.

Supplied: Tao Capsules—250 mg. and 125 mg.; bottles of 60. Tao for Oral Suspension—1.5 Gm.; 125 mg. per teaspoonful (5 cc.) when reconstituted; unusually palatable cherry flavor; 2 oz. bottle.

References: 1. English, A. R., and Fink, F. C.: Antibiotics & Chemother. (Aug.) 1958. 2. English, A. R., and McBride, T. J.: Antibiotics & Chemother. (Aug.) 1958. 3. Wennersten, J. R.: Antibiotic Med. & Clin. Therapy (Aug.) 1958. 4. Celmer, W. D., et al.: Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, p. 476.

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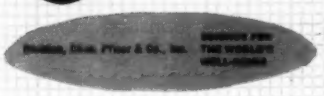

*TRADEMARK

TABLE 1

OUTLINE OF MEDICAL JURISPRUDENCE

I. Medical organization
   1. State licensure: official governmental certificates
   2. Medical organization relationships: American Medical Association, local medical societies
   3. Other special medical societies and groups; specialty groups
   4. Hospital administration and management: staff functions and responsibility
   5. Medical economics: private practice versus group practice; physician's tax problems; corporate practice of medicine

II. Criminal law
   1. Forensic psychiatry: insanity and mental disease; sex crimes; treatment of criminally insane; prevention of crime; juvenile delinquency
   2. Forensic pathology: coroner and medical examiner system; the investigation of homicides; toxicology
   3. Law enforcement agencies

III. Insurance and civil law
   1. Casualty insurance or accident insurance: personal injury; institutes and postgraduate education for doctors and lawyers; evaluation and extent of traumatic injuries; medical testimony, the doctor in the courtroom; workmen's compensation; rehabilitation programs
   2. Professional relations: doctor-patient relationship; malpractice; liability of the physician and hospital
   3. Accident and health, hospitalization, life insurance: the definition of risk; hospitalization programs; law of contracts, defining disease patterns

IV. Public health and industrial medicine
   1. Broad planning for prevention of disease, safety and health programs; integration of law and medicine in such matters as automobile safety, industrial accidents
   2. Legislation designed to affect medical affairs: food and drug laws; social security, etc.

in terms of doctors, lawyers, money and economics, is the field of personal or traumatic injury. About 70 per cent of the case load in state and federal courts is made up of personal injury compensation cases, and many other cases are disposed of before trial. The medicolegal element is quite important in the handling of cases involving accident or personal injury.

Physicians must evaluate the role of trauma in causing a disability or in aggravating a preexisting condition, as well as the extent and prognosis of injuries, in terms and language

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Important specific preparation for angina pectoris with hypertension

Metamine®
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Simplified, b.i.d. management of angina pectoris associated with hypertension. Each tablet contains 10 mg. METAMINE in sustained-release form and 0.1 mg. reserpine. **Dosage**: 1 tablet on arising, 1 before evening meal. Bottles of 50 tablets. THOS. LEEMING & CO., INC., New York 17.

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which can easily be translated into dollars and cents for compensation purposes.

In order to understand the medical and technical language, many lawyers have brought about the development of medicolegal courses and institutes. The greatest impetus has been through attorneys for compensation claimants who have grouped together in various organizations to further their common interests. An example of such an organization is the NACCA (National Association of Claimants' Compensation Attorneys). It is very active in the dissemination of literature and in conducting postgraduate medical courses wherein leading clinicians are invited to lecture and instruct trial attorneys on the latest medical theories and treatments of many traumatic conditions such as head injuries and intervertebral disks. Medical and law schools likewise are focusing more attention on this subject.

Expert testimony—Good medical expert testimony is available. Yet, in this day of decision by panel and committee, impartial medical panels are being organized. These panels are generally favored by physicians. It is easy to arrange for the examinations. The time factor is satisfactorily handled. All fees are paid and are reasonable. There is a minimum of administrative detail. The physician does not feel obligated to either party in the controversy. An air of impartiality and objectivity is maintained.

Scientific testimony has improved. The American Academy of Forensic Sciences has done much to bring about this achievement by setting high ethical standards for expert testifiers. As lawyers learn more about science and the scientists learn more about legal processes, the truth is approached with greater accuracy. The professional testifier of yesteryear is disappearing. In his place stand those specialists and physicians who because of complex and technical tests are called on to interpret their results. The synthesis of all these complex medical findings still poses some problems, however. This is a new feature in medical jurisprudence in this electronic age. For instance, in the department of physical medicine at the Massachusetts General Hos-

(Continued on page A-54)

NEW!

to prevent angina pectoris in the tense and anxious patient

Metamine®-C
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Butabarbital Sustained*

Simplified, b.i.d. therapy for 24-hour defense against angina pectoris associated with emotional or nervous tension. Each sustained-release tablet contains 10 mg. METAMINE and ¾ gr. butabarbital.

Dosage: 1 tablet on arising, 1 before evening meal. Bottles of 50 tablets. THOS. LEEMING & CO., INC., New York 17.

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pital we are developing and perfecting electric technics to measure muscle and nerve functions, a very important aspect in natural diseases and also in traumatic injuries where the question of muscle and nerve disability is so important.

Rehabilitation—What happens to the injured person? His basic motivation is to get well. However, the motivations of other parties make this goal difficult at times. One group of attorneys is interested in large awards, and one way to obtain them is to emphasize and magnify the injuries. Insurance company lawyers are primarily interested in low awards. Some experts lend themselves as partisans to either of these groups. The true medical picture is often befuddled.

Many agencies are stressing rehabilitation for injured persons. Workmen's compensation boards and rehabilitation boards are sponsoring programs to accomplish this. The question of compensation always lurks in the background in these cases. We do not know what effect this has in prolonging some disabilities and in promoting the exaggeration of other injuries. Of course, on the other hand there are very serious injuries which pose grave problems. Except for workmen's compensation, injury per se is not a basis for compensation. Liability or legal fault must be decided as well.

If there are real injuries, all energies should be directed toward total rehabilitation. Financial compensation should be used primarily for that purpose.

The ultimate objectives of restoration have created almost miraculous possibilities of recovery. In some cases this includes training for new and different occupations. Of course, the key is integration of all medical services and specialties. The family physician and the specialist both have vital roles and have a chance to participate in the rehabilitation conferences for patients, which include social workers, physical therapists, occupational therapists, vocational counselors and others in order to get the whole picture.

Many insurance companies, like the Liberty Mutual Insurance Company of Boston, likewise have pioneered the development of rehabilitation centers staffed by expert medical and technical people to promote the health of injured workers. This enables them to return to gainful employment after long and expensive treatment and thus resume their respected place in society and family. Such effects are salutary to the total well-being of the community and nation, rather than to have people moaning and groaning about ailments that may or may not be traumatic and in many cases are not serious enough to prevent carrying on the daily chores of life as we all do.

In the background of all this excellent work and development is the legal side of the matter. Some lawyers, and also physicians, for financial gain will encourage a person to continue an illness or prolong a disability, thus impeding the natural progress of improvement. This is encouraged by the failure to heed and seek sound medical professional advice and service. This stems from the motivation of the interested parties as mentioned earlier.

It is much more logical and less expensive to strive for rehabilitation and get the individual back into society than just to reward him financially for an accident. Some type of procedure to pay for costs of treatment and follow-up care is needed, more than just a financial award, and there seems to be a trend toward this.

This brief discussion of motivations is not conclusive but only general. It is not meant to discredit any of the parties named. However, if everyone pulled for rehabilitation and restoration of the patient or client concerned, trying to restore him physically and mentally without too much emphasis on compensation and money, many more cures and good recoveries would be forthcoming. There would be less tendency to feigned claims or neurotic claims. Most important, after careful and expert medical study, the person who is severely incapacitated would be managed much better and receive the long-term and expensive care he needs. The ultimate goal in personal injury should be to reduce the disability in incapacitated persons. This trend will result in a reduction of over-all medical costs, will reduce

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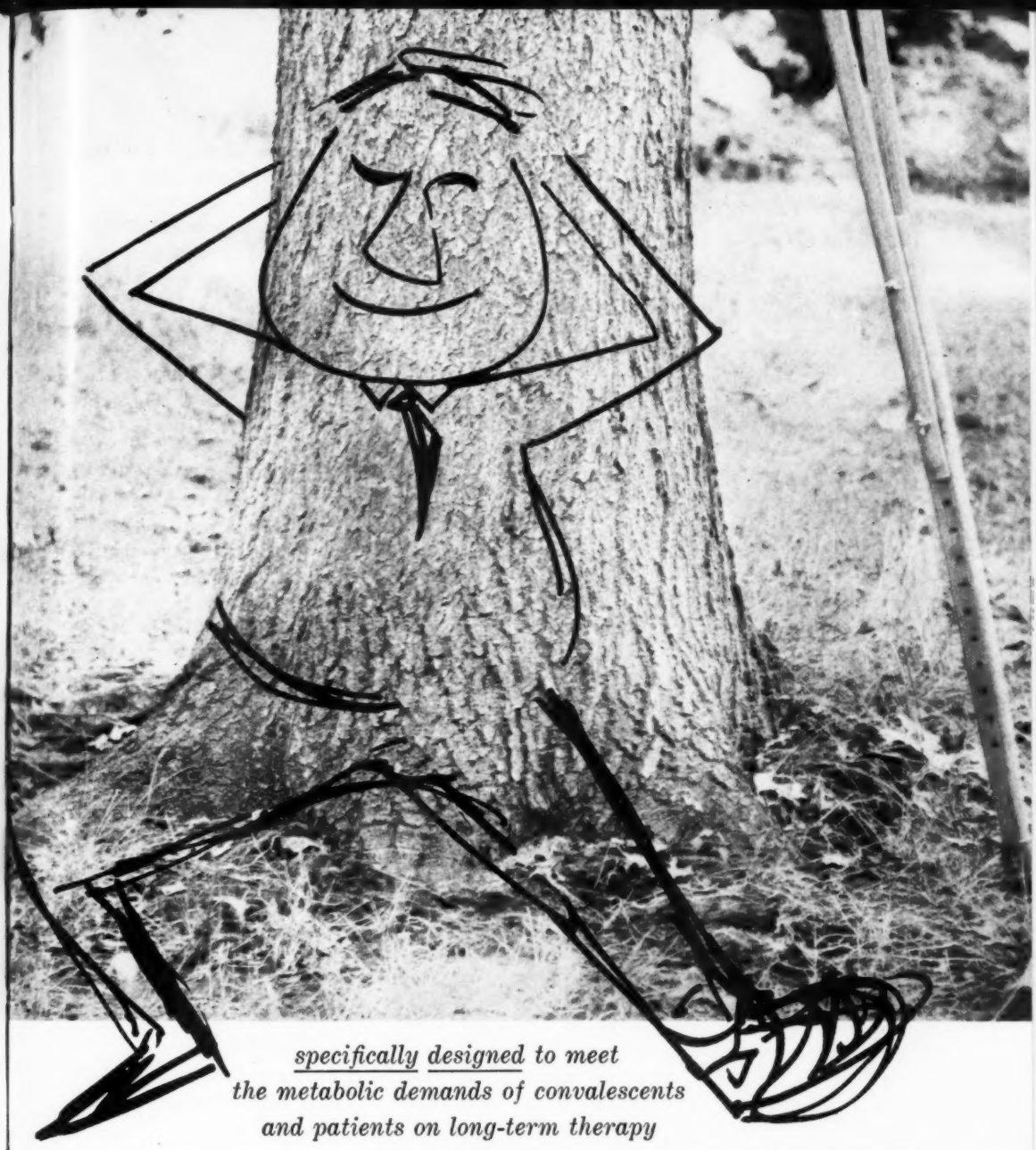

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compensation payments when medical improvement is realized, and will salvage the skill and training of the person concerned.

Professional Relations

This portion of the discussion refers to the doctor and his relationship to and in the direct care of patients.

The first trend deals with the unpleasant subject of malpractice, the pathology of medical practice. Let us embrace under malpractice suits against physicians situations such as assault and battery, negligence or actionable tort, failure to make administrative and statutory reports, and legal difficulties within hospital practice.

Regardless of the type of malpractice action, the number of suits or threats of suit against physicians today is increasing at an alarming rate in all parts of the country. In fact, in some areas malpractice is considered a definite occupational hazard. Some of our colleagues consider discussion of this distasteful subject taboo; the more enlightened believe that a healthier attitude is to analyze the facts and develop needed remedies.

In a recent California case, a diagnostic procedure, aortography, was done and the plaintiff was awarded $250,000 by a jury against one of the leading surgeons and the Stanford University Hospital. The plaintiff had serious disease prior to the procedure and did poorly afterward. Even though the decision in this case recently has been reversed, it is another indication of the trend of the claim-conscious public and of jurors to award large verdicts, of the skill and attitudes of the attorneys in obtaining such verdicts, and of the indifference of so many members of the medical profession to these trends.

Without going into the details of this case, it is obvious that physicians and the medical profession cannot stand a trend of large compensation awards for poor results in diagnostic studies. Where the liability is thin or very questionable, it is even more painful.

The practice of medicine, as we all know, is dependent on certain risks at all times. Good health is not a constitutional guarantee but something to strive for. No one would want his physician to forego the use of a test or procedure because of the possibility of a bad result. Many new technics still are not perfect. The case cited and numerous ones like it, similar in theory but not in amount, if they continue as a legal precedent, will only dampen the enthusiasm and genius of some of our excellent physicians and scientists who continually strive for new improvements and methods.

To check this ominous trend, it behooves us all, both legal and medical professions, to refrain from undermining the public's confidence. Both professions thrive on confidence and mutual trust. Medicine will thus continue to progress and we will all receive the benefits.

Hospitals, both large and small, likewise are beginning to feel the brunt of increasing claims for accidents and mishaps. The idea of charitable institutions exempt from liability is antiquated according to the trend of recent legal decisions. Hospitals employing physicians are being held accountable for medical malpractice as well as for the conduct of their many other employees who participate in the care of patients. As in the case mentioned earlier, the hospitals are joined with the physicians as defendants whenever the situation can support such a claim.

Another development which deserves mention is the slow disintegration of the physician-patient relationship. The introduction of "third parties" into the practice of medicine has changed this relationship. Insurance companies and their agents, paramedical groups, clinic-type practice, and expanding hospital-medical care programs have brought about these changes. This trend is easily reflected by the court decisions and in the legislative enactments dealing with various phases of medical practice.

Thus the contractual relationship of hospitals to patients and doctors has brought about many changes in the field of professional relations.

What good is it to have all the scientific knowledge and technical advancements if they cannot be applied properly? The reason for the great successes in American medicine has been the confidential physician-patient rela-

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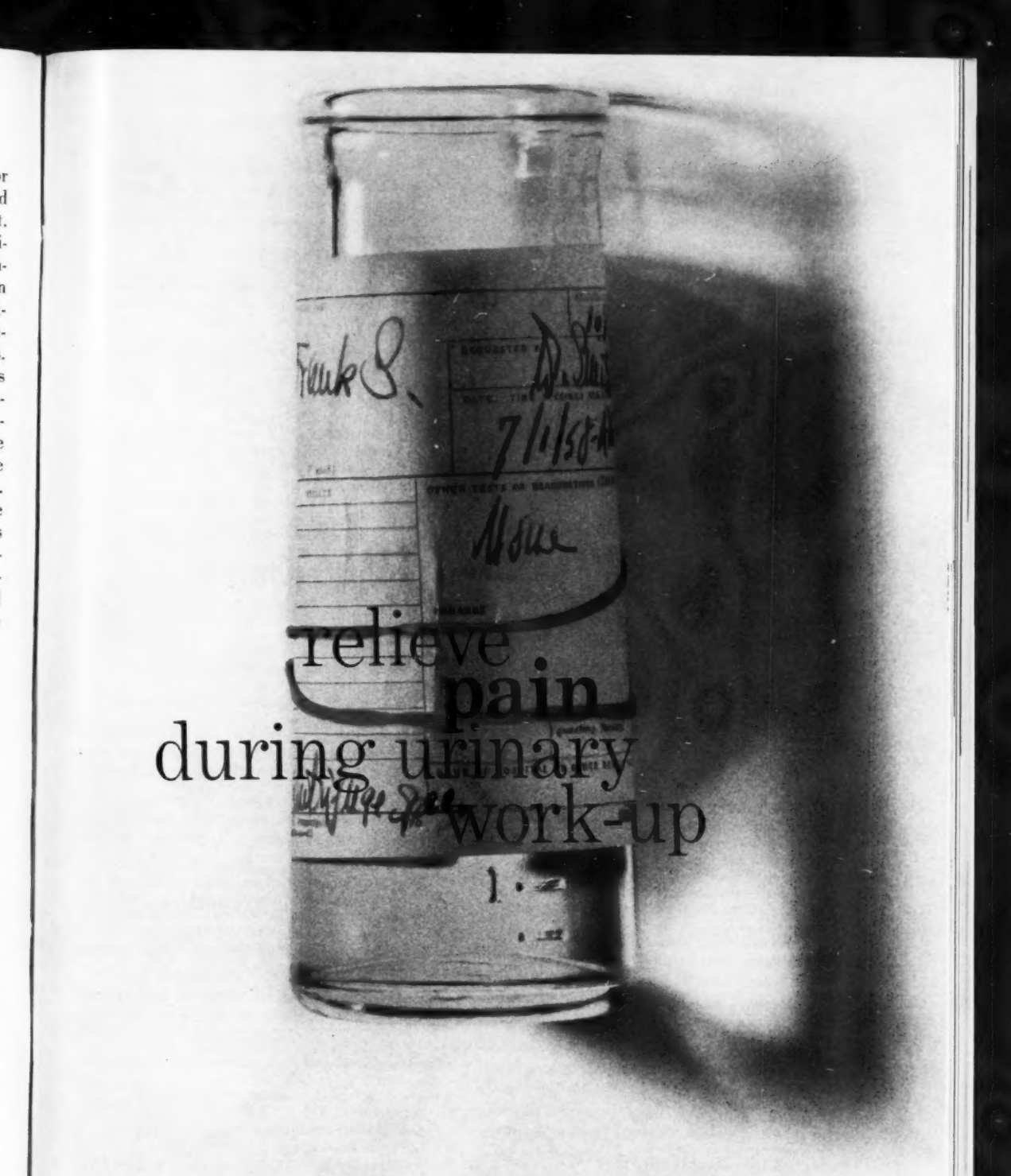

Pyridium assures prompt and continuous analgesia within 30 minutes—well before corrective measures can remove the cause. Prognosis improves with normal voiding, and the infective risk of stagnant urine is removed. Alone, or with the urinary antibacterial of your choice, Pyridium provides rapid relief.

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tionship supported by these great advancements. The mechanism for successful practice and care of patients is the intimate and confidential relationship of physician to patient. This is the art and very practice of medicine and the essential ingredient in the successful care of the sick. Machines and robots cannot replace the ultimate medium of exchange between doctor and patient.

There is a trend in many localities and organizations for mutual cooperation between the two professions of law and medicine through interprofessional meetings, association and codes. This spirit of cooperation always helps to further the strong ties and mutual respect which each of the professions deserves and thus helps to serve the public better.

Discussing matters in medical jurisprudence always opens the door to various views. The very nature of the matter is controversial. Through discussions, writings and probings, it is hoped that ideas will be born to better the lot of all of us. The professions of law and medicine have much to offer individually, and more collectively.

MEETINGS—*and Postgraduate Courses*

SISTER ELIZABETH KENNY FOUNDATION, MINNEAPOLIS: Postdoctoral scholarships in neuromuscular diseases are available to selected candidates from medical schools in the United States and Canada who are nearing the completion of their fellowship training. Awarded annually, these scholarships provide a stipend for a five year period of from $5000 to $7000 per year, depending on the scholar's qualifications. For further information, write to: Dr. E. J. Huenekens, Medical Director, Sister Elizabeth Kenny Foundation, Inc., 2400 Foshay Tower, Minneapolis 2.

TEMPLE UNIVERSITY SCHOOL OF MEDICINE, PHILADELPHIA: Postgraduate courses for 1959:

Broncho-esophagology, February 16-27
Laryngology and laryngeal surgery, April 13-24

For further information, write to: Jackson-Research, Lab 604, Temple University School of Medicine, 3400 North Broad Street, Philadelphia 40.

UNIVERSITY OF COLORADO MEDICAL CENTER, DENVER: Postgraduate courses for 1959:

General practice review, January 19-24
Medical technology, March 16-21
Neurology, May 14-16
Colorado intern-resident clinic, May 21-22
Internal medicine, June 15-19
Clinical hematology, June 22-27
Obstetrics and gynecology, July 6-8
Ophthalmology (Aspen), July 6-9
Dermatology for general practitioners, July 16-18
Western cardiac conference, August 10-15
The prevention and management of athletic injuries, August 24-26
Pediatrics (Estes Park), September 10-15
Hematology, October

For further information, write to: Office of Postgraduate Medical Education, University of Colorado Medical Center, 4200 East Ninth Avenue, Denver 20.

UNIVERSITY OF KANSAS SCHOOL OF MEDICINE, KANSAS CITY: Postgraduate courses for 1959:

Symposia
- Pulmonary disease, January 19-20
- Gastroenterology, January 21-22
- The ophthalmoscope: Its medical use, January 23
- Endocrinology and metabolism, January 28-29
- Radiology, February 9-11
- Hematology, February 16-17
- Peripheral vascular disease, February 18-19
- Electrocardiography, February 23-24
- Neurology and neurosurgery, February 25-26
- Pediatrics, March 9-11
- Cardiac auscultation, March 23-24
- Otolaryngology, April 6-8
- Ophthalmology, April 8-10
- Anesthesiology, April 13-15
- Surgery, May 18-21

Special skills courses
- Radiologic physics, January 11-March 15
- Histochemistry, June 8-20
- Clinical use of radioisotopes, by arrangement

Correspondence courses
- Interpretation of electrocardiograms—I, March 27-September 18
- Interpretation of electrocardiograms—II, April 23-October 15
- Hematology—I, April 27-November 30

For further information, write to: Department of Postgraduate Medicine, University of Kansas School of Medicine, Kansas City 12.

UNIVERSITY OF TEXAS POSTGRADUATE SCHOOL OF MEDICINE, HOUSTON: Practical electrocardiography, with emphasis on spatial vectorcardiography, December 15-19. For further information, write to: The University of Texas Postgraduate School of Medicine, 410 Jesse Jones Library Building, Houston 25.

YALE UNIVERSITY SCHOOL OF MEDICINE, NEW HAVEN: Postgraduate courses offered in cooperation with Grace-New Haven Community Hospital and the Connecticut State Medical Society:

Advances in diagnosis and management of heart disease, March 5-April 23

Study units, weekly sessions during 1958-1959:
- Arthritis
- Cardiovascular medicine
- Gastrointestinal diseases
- Neoplasm conference
- Neurology
- Poliomyelitis
- Psychiatry and law

For further information, write to: Dr. Arthur Ebhert, Jr., Assistant Dean of Postgraduate Medical Education, 333 Cedar Street, New Haven 11.

Radiology FOR PRACTICING PHYSICIANS

Accessory Bones of the Foot and Ankle

PAUL C. HODGES*

In addition to the seven normal tarsals, there are five fairly common and five rare ossicles which must be kept in mind when one considers a diagnosis of chip fracture in the foot or ankle. Knowledge of most of these anomalies goes back to the early days of anatomy.[1] but they have become clinically important only with the development of radiology and of legislation concerning liability for personal injuries.[2,3] The most common error is to mistake an ossicle for a chip fracture; however, at times, a fracture is mistaken for an ossicle. The demonstration of bilateralism in cases of unilateral symptoms almost rules out fracture; but the converse is far from true, because the existence of unilateral anomalies has been well established.

The five common ossicles are shown in figure 1A and B, the five rare ones in figure 1C.

The Five Common Ossicles

Os vesalianum pedis—Most controversial of the ossicles is the os vesalianum pedis (figure 1A and B). More than 400 years ago Vesalius' artist, Jan Stephen Kalkar, in his woodcut No. 33 (figure 2μ) portraying the dorsal and plantar aspects of the right foot, showed a small ossicle lying at the proximal end of the fifth metatarsal, which became known as the bone of Vesalius. Within the past half century it has become increasingly popular to question whether the world's greatest anatomist and his enormously capable artist knew what they were about. Some have argued that obviously the plantar view is of one foot, the dorsal view of another, and that it cannot be possible in either case that the ossicle shown is an unfused fifth metatarsal tuberosity that has developed from a separate center. Since this is not the place to discuss the role of semantics and eponyms in medical nomenclature, I shall simply state and not defend my conviction that there is such a bone as os vesalianum pedis and that it represents an adult fifth metatarsal tuberosity which developed from a separate center and failed to fuse with the shaft during childhood.[4] Care must be taken to differentiate it from the appearance of the tuberosity in chil-

*Emeritus Professor and Chairman, Department of Radiology, University of Chicago, Chicago, Illinois.

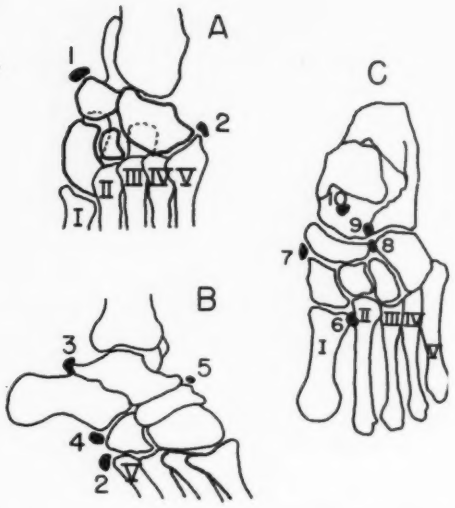


FIGURE 1. Diagram of accessory bones of foot and ankle.

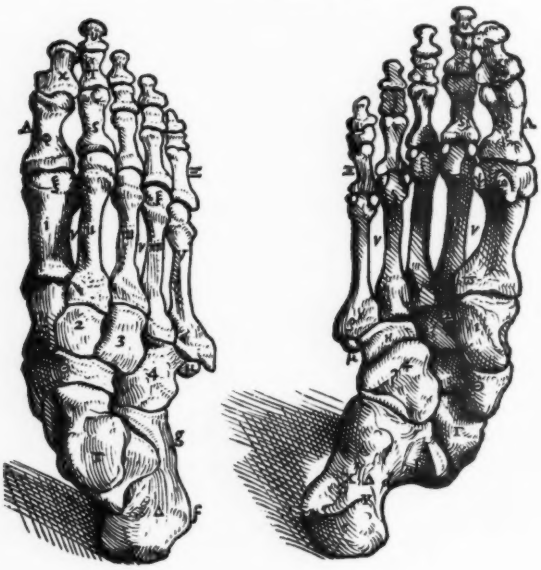
A and B. Dorsal view (astragalus removed) and lateral view of left ankle, showing the five more common ossicles.

1. Os tibiale externum
2. Os vesalianum pedis
3. Os trigonum
4. Peroneal sesamoid
5. Astragaloscaphoid

C. Dorsal view of left ankle, showing the five rare ossicles.

6. Intermetatarsal
7. Paracuneiform
8. Secondary cuboid
9. Secondary calcaneus
10. Secondary astragalus

FIGURE 2. Bone of Vesalius. Reproduction of Kalkar's famous woodcut.[1] The ossicle is lettered μ.



dren during that brief period when the center has ossified but has not yet fused with the shaft; even more important is differentiation from fracture of the tuberosity (figures 3 and 4). The lesion is well shown in films made with the plantar surface down, the foot being rotated slightly inward; it sometimes shows even better with the dorsal surface of the foot against the film.

Os trigonum—This small, frequently encountered ossicle, lying at the junction of the posterior lip of the astragalus and the os calcis, shows best in the lateral view (figure 1B, No. 3). By an inexplicable quirk of terminology, current medical dictionaries still carry the item "Shepherd's fracture," because approximately 80 years ago the Canadian surgeon-anatomist F. J. Shepherd, encountering an os trigonum in the dissecting room, mistook it for a fracture of the astragalus and described it as such in a paper read April 14, 1882, and published in 1883.[5] In the same journal in which Shepherd's paper appeared, Turner[6] corrected the mistake and identified Shepherd's "fracture" as an ossicle, and by 1887 Shepherd had discarded his earlier view.[7]

The posterior external tubercle of the astragalus varies widely in size and shape, and when it is unusually long on one side and an os trigonum is present on the other there is reason to believe that the long tubercle is made up in part of a trigonum that has fused with the tuberosity in maturation of the skeleton.

Peroneal sesamoid—This commonly encountered ossicle, lying at the lateral side of the cuboid, is an osseous sesamoid in the tendon of the peroneus longus. It occurs in that portion of the tendon which lies in a groove at the lateral aspect of the cuboid where the tendon crosses that bone to enter the sole of the foot. Usually the peroneal sesamoid is cartilaginous and invisible; it is only when it contains bone that it can be seen by x-ray. It may be large or small, solitary or bipartite, unilateral or bilateral (figures 3, 5 and 6).

Os tibiale externum—Usually bilateral and occasionally quite large, this ossicle, lying at the medial side of the foot adjacent to the scaphoid, is a secondary ossification center for the scaphoid which has failed to fuse with the

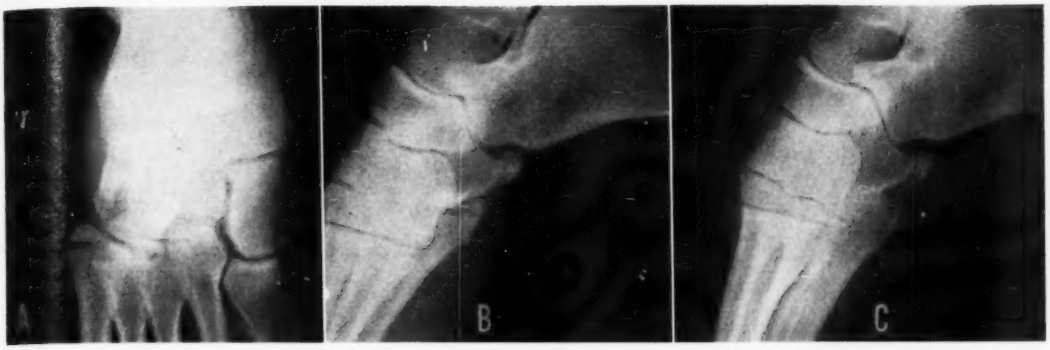


FIGURE 3. Fracture of tuberosity of fifth metatarsal, simulating os vesalianum pedis.

A. Dorsal view.

B. Lateral view of right foot of adult woman immediately following injury. The patient also had a peroneal sesamoid (figure 6).

C. Two years later; complete union of the fracture has occurred.

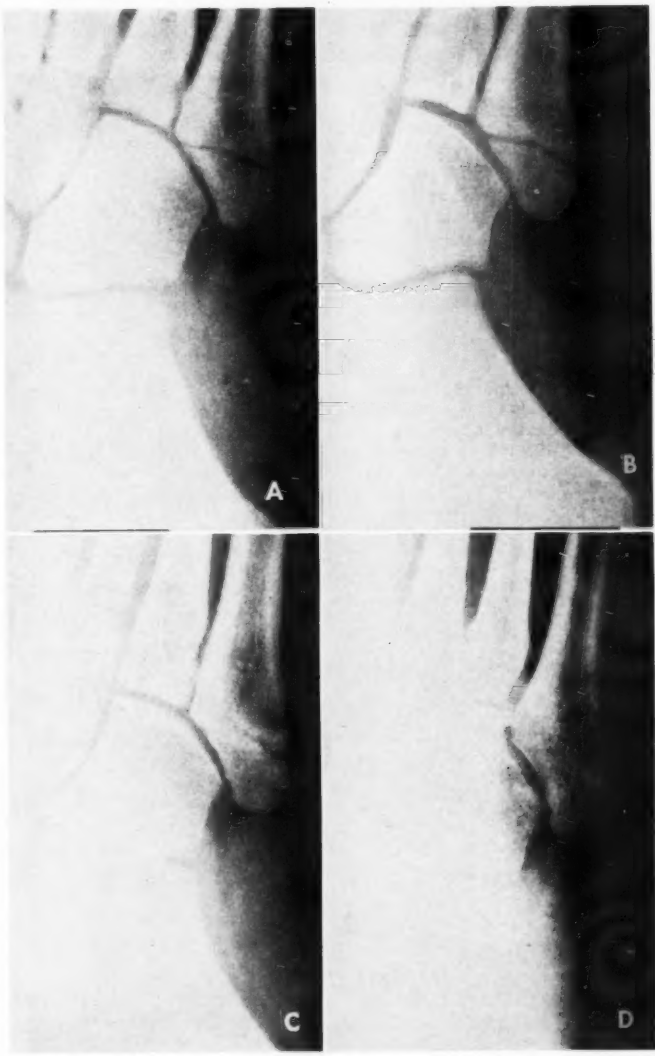


FIGURE 4. Fracture of tuberosity of fifth metatarsal, simulating os vesalianum pedis.

A. Dorsal view of right foot of a 19 year old woman immediately following injury. There was localized pain, and the sharpness of the black line separating the tuberosity from the shaft argues strongly for fracture and against an unfused center. A cast was applied and clinical cure occurred.

B. Four months later; recurrence of symptoms after secondary injury. Now, appearance is much more like os vesalianum pedis; but knowledge of the findings shown in the A view precludes that diagnosis.

C. Seven months following injury; union is occurring.

D. Union is complete 18 months after original injury.

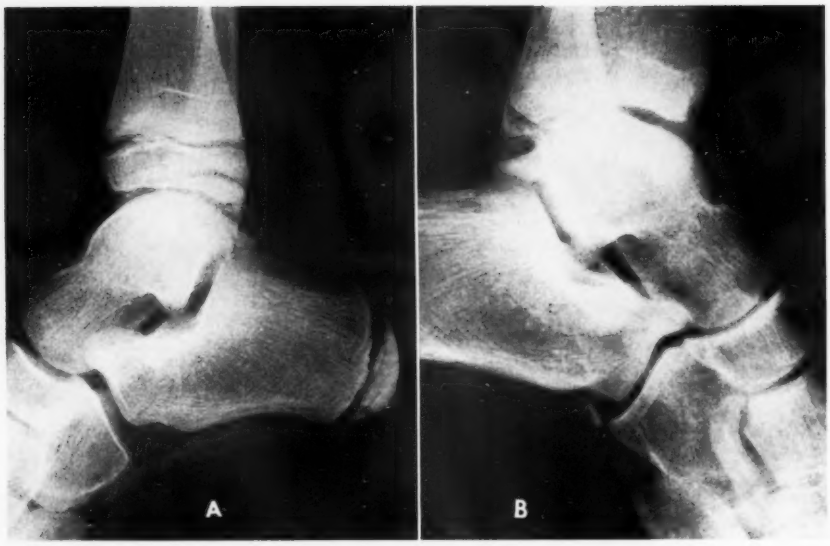


FIGURE 5. Unilateral os trigonum.

A. Lateral view of the right ankle of a nine year old boy, showing os trigonum at posterior lip of astragalus, a condition once miscalled "Shepherd's fracture."

B. Left foot of the same patient 16 years later. There is no os trigonum on this side, but there is a peroneal sesamoid (figure 6).

FIGURE 6. Peroneal sesamoids. (See figures 3 and 5.)

A and B. Left and right foot of a 58 year old woman demonstrating bilateral peroneal sesamoids.

C. Bipartite peroneal sesamoid of right foot.

D. Unusually large peroneal sesamoid of right foot.

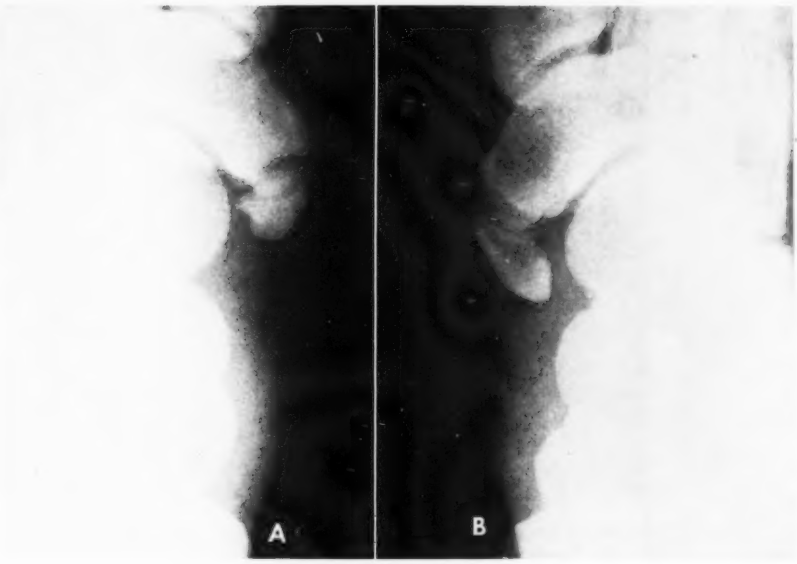


FIGURE 7. Plantar surface views of bilateral os tibiale externum.
A. Left foot.
B. Right foot of a 22 year old man who, five years earlier, had been given a diagnosis of fracture of the left scaphoid. An even larger ossicle is present on the right side, where there were no symptoms. Certainly these are congenital anomalies rather than fractures, but the mere presence of ossicles as large as these may cause symptoms.

main portion of the bone (figure 7). It shows best in films made with the plantar surface down and the foot rotated slightly outward; it seldom is mistaken for a fracture, as in the case illustrated in figure 7.

Astragaloscaphoid—In 1921, the late Canadian radiologist A. Howard Pirie[8] reported 14 cases of an ossicle lying at the dorsal surface of the foot at the junction of the astragalus and the scaphoid (figure 1). He had gathered these cases during the inspection of hundreds of x-ray plates of British soldiers in World War I. In 4 of the 14, the ossicle was bilateral.

The Five Rare Ossicles

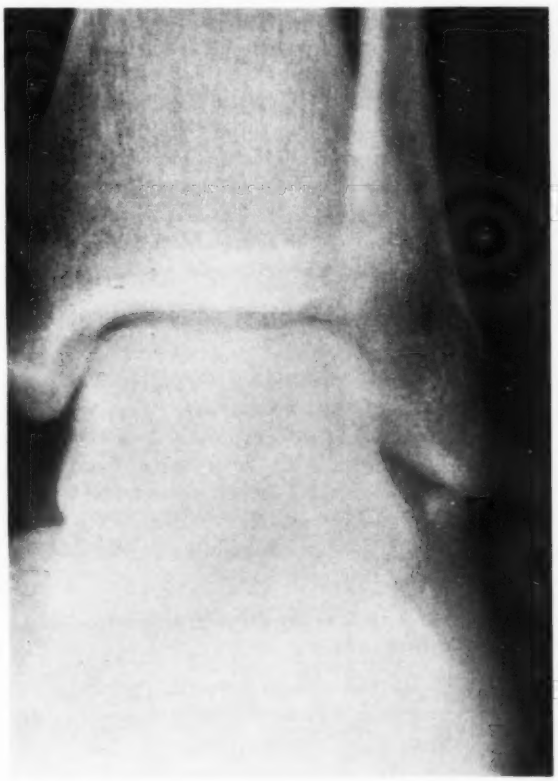
All five ossicles are extremely uncommon. For convenience, they have been shown diagrammatically in the dorsal view (figure 1C), but at least two of them can be seen only in lateral views.

Intermetatarsal—This rare ossicle, occurring between the proximal ends of metatarsals I and II, is sometimes mistaken for an exostosis or calcification in a vessel.

Paracuneiform—This unusual ossicle lies at the inner border of the foot at the cartilage space between the scaphoid and the first cuneiform bone.

Secondary cuboid—This small ossicle lies

FIGURE 8. Ossicle simulating fracture of styloid of fibula. This 24 year old man was referred because of sprain of left ankle; but on examination, pain and ecchymosis were confined to other parts of the foot and were not present in the region of the ossicle.



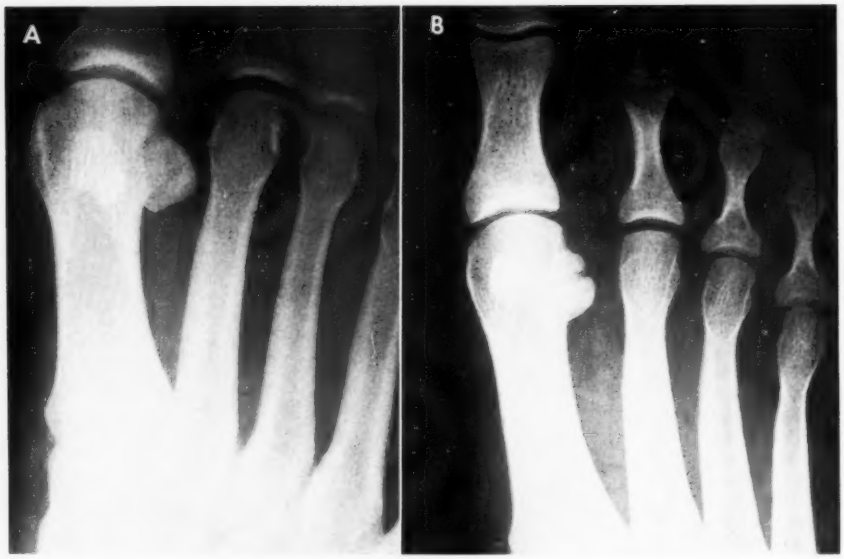


FIGURE 9. Normal and bipartite sesamoids at metatarsophalangeal joints.

A. Normal sesamoids at first metatarsophalangeal joint of 23 year old man.

B. Normal medial and bipartite lateral sesamoid at first metatarsophalangeal joint of a 16 year old girl.

Normally, two sesamoids are present at the first metatarsophalangeal joint. Occasionally, one or two may be present at the second, third and fourth joints, rarely at the fifth.

at the angle between the cuboid, the scaphoid and the third cuneiform.

Secondary calcaneus—Shown best in lateral views, where it lies at the anterior end of the os calcis, this ossicle may represent an unfused center for the tip of the apophysis.

Secondary astragalus—Shown diagrammatically in the dorsal view (figure 1C), this uncommon ossicle at the dorsal surface of the anterior end of the astragalus actually can be seen only in the lateral views.

Ossicles at Inner and Outer Malleoli

Occasionally there are secondary centers for the inner malleolus of the tibia and the outer malleolus of the fibula; and, sometimes, instead of fusing with the shaft, they persist as ossicles. In the case illustrated in figure 8, it would have been difficult to defend a diagnosis of ossicle rather than fracture if there had been even reasonably good clinical evidence for fracture.

Sesamoids at the Metatarsophalangeal Joints

The two sesamoids normally present at the first metatarsophalangeal joint sometimes are involved in arthritis and may be fractured, but most of the so-called fractures are merely sesamoids that have developed from two centers and have failed to fuse (figure 9). Infrequently, one or more sesamoids occur at metatarsophalangeal joints 2, 3 and 4, but it is most uncommon to find them at 5.[9]

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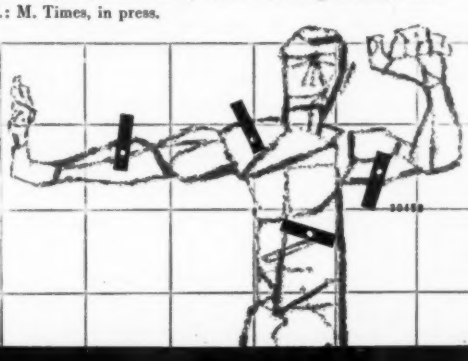

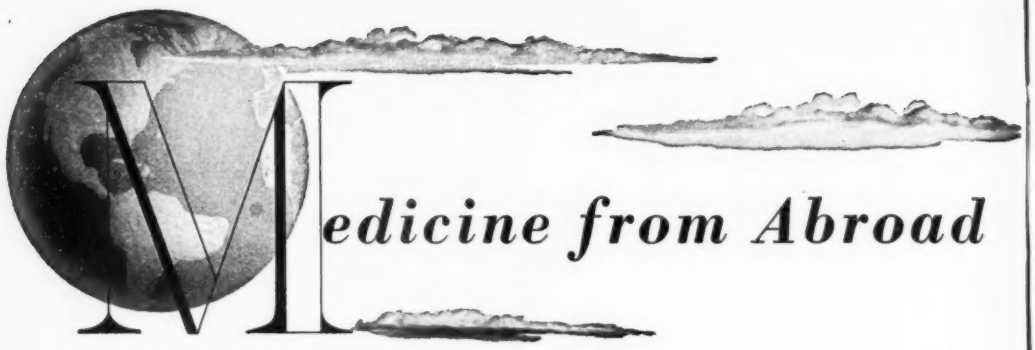

Medicine from Abroad

FROM POSTGRADUATE MEDICINE'S CORRESPONDENTS

AUSTRALIA

Radiation hazards to the fetus—After studying a series of 168 children who died of leukemia, Professor Lance Townsend of the University of Melbourne reported that in only 7 per cent could the disease have been caused by irradiation in utero.

In Victoria, the mortality from leukemia of children whose mothers have x-ray examination during pregnancy is only one per year. On the other hand, 1000 stillbirths and neonatal deaths from other causes occur annually.

In his report in the *Medical Journal of Australia*, Professor Townsend stated that it still has not been proved that x-ray examination of the mother's abdomen causes leukemia in the fetus. However, the lack of a control series made it impossible to prove that irradiation does not cause leukemia. He therefore advocated some general rules regarding x-ray examination during pregnancy and cautioned that great care should be taken to prevent unnecessary x-rays of pregnant women because of the genetic risk to mother and baby.

Professor Townsend concluded that if necessary medical information can be obtained only by x-ray examination of the mother, the baby's life is in greater danger if the examination is not made than if leukemia subsequently develops.

Trends in managing tuberculosis—Statistics to support the following conclusions regarding tuberculosis have been published in the *Medical Journal of Australia* by P. S. Woodruff, Department of Public Health, Adelaide.

1. The mortality rate in patients with tuberculosis has decreased significantly for the first time in 10 years.

2. Old-style sanatoriums are now being replaced by chest hospitals or units where both inpatients and outpatients receive relatively brief and intensive treatment. However, there is still some need for inpatient care of persons who are partially or totally disabled by respiratory disease. Most of these patients are men.

3. X-ray surveys must be continued, since it is estimated that in this community one of every 1100 people not yet examined has active tuberculosis. These surveys should be repeated every three years.

4. Intensive treatment of children has decreased the incidence of tubercular meningitis. Proper examination for tuberculosis in pregnant women has done much to reduce the occurrence of primary tuberculosis in infants.

5. Since primary tuberculosis is much more likely to progress or to disseminate widely in an adolescent than in a young child, the greatest benefit from the widespread use of BCG vaccine may be expected in the teen-age population.

AUSTRIA

Altitude and the cardiovascular system—In an address to the Society of Physicians in Vienna, Dr. M. Halhuber discussed the effects of high altitude and mountain climate on the cardiovascular systems of healthy and sick persons.

(Continued on page A-86)

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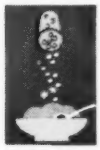

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During recent years, members of the medical clinic of the University of Innsbruck and the medico-meteorologic research group of the German weather bureau in Hamburg have investigated the problems of climatotherapy and of winter sportsmen in adapting to medium altitudes. They observed different types of cardiovascular reactions within a few hours after patients had stayed briefly at higher altitudes, e.g., after trips on the mountain railway. The examinations were continued for several weeks. At the end of the first week and, especially, during the third week of the patients' stay in the mountains, distinctly increased reactions could be demonstrated by the Wexler-Böger method of physical analysis of the circulation and by tolerance tests such as anoxia, eyeball pressure and standing tests. A descent to valley level produced bradycardia at rest and markedly decreased reactions to the tolerance tests.

For four weeks these workers carried out a series of measurements on patients arriving from Hamburg. These tests showed parallel drops in the tonus of the arterial system, reflected in the blood pressure; in the pulse wave velocity of the basic arterial oscillations; and in the elastic resistance. The studies indicated that in order to be benefited by climatotherapy patients must remain at least four weeks in the prescribed climate.

Reporting on his clinical experiences with cardiovascular patients, Dr. Halhuber discussed the reasons why a mountain climate could be dangerous to patients with coronary disease, although neither hypertension nor compensated heart-failure contraindicates a stay in high mountains.

Adrenogenital syndrome and pregnancy —Speaking to the members of the Austrian Society for Gynecology and Obstetrics, Dr. H. Husslein of Vienna described a case of primary sterility ascribed to a postpuberal form of the adrenogenital syndrome. Before receiving continuous treatment with cortisone, the patient would fail to menstruate for months; after starting treatment, she had a normal estrus cycle and soon conceived. Abortion occurred late in her first two pregnancies, since her physicians believed it necessary to reduce the maintenance dosage of cortisone during pregnancy. Given adequate cortisone during her third pregnancy, she gave birth to a healthy baby after a gestation period of 226 days. The weight of the placenta was within normal limits and the baby weighed 3100 gm.

Dr. J. Froewis commented that it would be

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essential to observe the child's future development. Due to the fear of damage to the fetal adrenal glands, cortisone therapy formerly was contraindicated in pregnancy. More recently, some authors have recommended that cortisone be given intravenously for a short period to patients with morning sickness. Dr. Husslein concluded that although cortisone was generally contraindicated in pregnancy, it was necessary to give it to a patient with the adrenogenital syndrome. In the case presented this medication alone enabled the patient to carry the fetus to full term.

Erosion of the vaginal cervix—Another gynecologic problem was discussed by Drs. K. Brandl and V. Grünberger, who described the different types of erosions that occur on the vaginal portion of the cervix. They showed that uterine cervical carcinoma frequently occurs in the presence of erosions that appear benign macroscopically. Their studies of 2000 patients in one series and 17,000 in another demonstrated the frequency of cervical erosions in patients with and without gynecologic conditions. On the basis of macroscopic examination, a high percentage of these erosions were suspected of being cancerous. The lecturers emphasized that all erosions, even those considered benign, must be thoroughly examined in order to permit the early detection and long-lasting cure of carcinomas.

BRAZIL

Prausnitz-Küstner test—Results of this test made on patients who had positive reactions to histoplasmin were reported by Dr. Lacaz, Inah Esteves Almeida, Lon Cury, Ernesto Mendes and Therezinha A. Salomão. Positive reactions were obtained in 19 per cent of 500 patients on whom skin tests with histoplasmin were performed. Most of the positive reactions were in men more than 21 years of age. The Prausnitz-Küstner test was made with the serums of 18 patients who reacted positively to histoplasmin; a positive reaction occurred in only one patient.

Allergy in children—Annelise Strauss has reported on data obtained from the study of 50 allergic children, outpatients of the Clinic of Allergy of the Hospital das Clinicas in São Paulo. The author emphasized the high incidence of allergic manifestations in relatives of the patients and the very early appearance of the first

(Continued on page A-88)

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1. Shane, S. J., Krzyski, T. K., and Copp, S. E.: Canad. M.A.J. 77:600 (Sept. 15) 1957.

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symptoms indicative of an allergic constitution. Respiratory symptoms were the most frequently found and were present in all age groups, while cutaneous and digestive symptoms predominated in children less than six years of age.

Inhalants were found to be the most common allergens sensitizing children from early infancy. Hypersensitivity to foods predominated in children less than six years of age; milk was the most common food allergen. Meteorologic and psychologic factors were evident, and infection strongly influenced allergy in the first years of life. Most of the children had multiple allergic manifestations caused by several factors, occurring simultaneously or at different times.

Behavior of platelets in patients allergic to drugs—To determine the action of platelets in persons allergic to drugs, Arruda Pacheco, Ernesto Mendes and Professor Ulhoa Cintra employed a slightly modified form of the method used by Storck and Hoigné. They found that platelets decreased more than 15 per cent in patients who had positive reactions to the test made in vivo and who were indisputably allergic to drugs. Eight of 12 allergic patients had positive reactions to both in vivo and in vitro tests. Six of the 18 patients in the control group had positive reactions above 15 per cent when the test was made in vivo. The authors reported the probable mechanisms as well as the possibilities of using methods other than those which are based on cutaneous reactions to diagnose allergy to drugs.

Influence of chickenpox on tuberculous children—Thirty-four tuberculous children who had chickenpox have been studied by Paulo Vilhena de Moraes. It was found that x-ray examinations very rarely revealed nonspecific alterations of the lungs or aggravations of tuberculous foci receiving specific treatment. Regression of tuberculous lesions was not affected by the disease. Tuberculous sensitivity was but slightly altered and was shown only by searching the sensitivity threshold. A decrease of the threshold was observed in 50 per cent of those studied. Chickenpox does not cause marked changes of the immunobiologic condition of patients who are receiving specific treatment. The author concluded that alterations of the tuberculin sensitivity must be due to reaction changes of the cutaneous capillaries.

The material covered in this report from Brazil was published in *Revista do Hospital das clinicas.*

DENMARK

Hemorrhage caused by ulcers—Problems arising in treating acute major hemorrhage caused by duodenal or stomach ulcers were studied for a period of 23 years by Olaf Römcke, Kaare Liavaag and Biörn Paudal in the medical and surgical departments of Drammen Hospital. During this time ulcer was either definitely diagnosed by x-ray examination or thought highly probable from clinical findings in 1,434 patients in whom hematemesis and melena were present.

The study is divided into three periods, according to the type of therapy used. From January 1, 1935 to September 16, 1941, all patients were treated conservatively. From September 17, 1941 to December 31, 1950, some patients were treated surgically. The indications for surgery in these patients were the same as those recognized during the third period; however, they were not considered in the same order of importance that they are today. From January 1, 1951 to December 12, 1957, the following therapeutic measures were applied.

If the presence of other disease did not contraindicate an operation, subtotal gastrectomy was considered indicated for patients more than 45 years of age when the hemorrhage continued or recurred during adequate medical treatment in the hospital. In some patients the ulcer was not found during the operation, and a blind resection was performed. The remainder of the stomach was always closely inspected before anastomosis was performed. A second hemorrhage did not occur in any of these patients. In two patients, hepatic cirrhosis with esophageal varices was found to be the cause of the bleeding; both patients survived laparotomy.

Surgeons as well as internists attended the patients during the acute stage of the disease. Preoperative x-ray examinations were not made, since the authors found that such examinations may be misleading. In several cases, hemorrhage was caused by an ulcer other than the one revealed by x-ray examination.

During this study, the age distribution of the patients changed considerably. In the first period the average age was 47.5 years, in the second period 52.2, and in the third period 56.1. In the three periods, 21.0, 32.7 and 47.5 per cent of the patients, respectively, were more than 60 years old. On the basis of their own investigation and the work of others, the authors be-

(Continued on page A-90)

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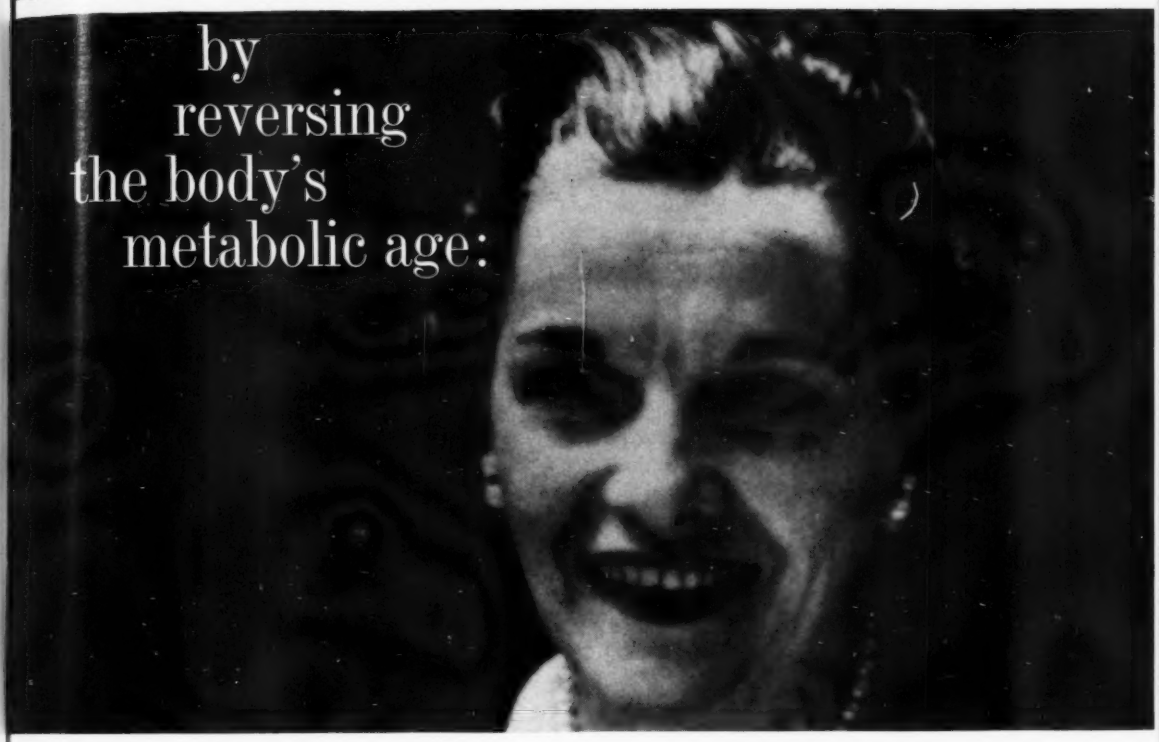

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lieve that patients more than 60 years of age have a greatly increased tendency to continuing or recurring hemorrhage after treatment. Patients with this condition numbered 54 (20.6 per cent) in the first period, 136 (22.9 per cent) in the second, and 160 (27.5 per cent) in the third. Because of this increase, more patients were treated surgically in the third period. No operations were done in the first period; 26.3 per cent of patients seen in the second period and 55.6 per cent of patients in the third period who had continuing or recurring bleeding were treated surgically.

The total mortality rate was as follows: first period, 14 of 262 patients (5.3 per cent); second period, 29 of 593 (4.9 per cent); third period, 24 of 579 (4.1 per cent). Of greater interest was the mortality rate among those patients who had continuing or recurring hemorrhage after treatment. In the first period, 16.6 per cent of the patients died; 16.9 per cent died in the second period, and 7.5 per cent in the third period. For the patients who did not have continuing or recurring bleeding, the mortality rates for the three periods were 2.4, 1.3 and 2.9 per cent, respectively. Deaths caused by operation decreased sharply—from 10 of 35 patients (28.5 per cent) in the second period to 6 of 89 patients (6.7 per cent) in the third period.

ENGLAND

Medical Research Council—The annual report of the Medical Research Council recorded that on an income of £3 million ($8.5 million) the Council maintained the National Institute for Medical Research in London, research laboratories in Gambia (West Africa), and 44 research units and 21 research groups; provided numerous research and training grants; and supported to a varying extent the Institute of Cancer Research in London, the research department of the Beatson Memorial Hospital and Radium Institute in Glasgow, and the research program of the Holt Radium Institute in Manchester. On behalf of the Ministry of Health, the Council also administered the Public Health Laboratory Service and the Blood Products Laboratory. During the year the Council set up four new units, their locations and purposes as follows: at Leeds for research on metabolic disturbances of surgery; at Exeter for research on carcinogenic substances; at Edinburgh for research on the general effects of radiation; and the virus culture laboratory at Carshalton, near London. The microbial genetics research unit at the Postgraduate Medical School in London was set up after the period of the report.

Culdoscopy—At a meeting of the Section of Obstetrics and Gynecology of the Royal Society of Medicine, Dr. T. N. A. Jeffcoate of Liverpool University discussed the value of the diagnostic procedure known as culdoscopy, the use of the endoscope passed through Douglas' pouch. This method of diagnosis was introduced by Décker and Cherry of New York in 1944, but has not been employed in England until recently. Having successfully used it abroad late in 1955, Dr. Jeffcoate introduced culdoscopy into his hospital unit, where in the past two years it has been employed in 44 cases. Four of these cases were failures, undoubtedly because they were not well selected. Dr. Jeffcoate found that the secret of success and safety was to place the patient in the knee-chest (not knee-elbow) position. Bearing in mind the natural apprehension of patients and his own comparative lack of experience, he employed general anesthesia in all but four cases; a doubled pillow was used to protect the patient's chest and shoulders from the hard impact of the operating table. Endotracheal anesthesia is essential to maintain adequate oxygenation. Cystic ovaries, a recent corpus luteum, adhesions and other lesions can be recognized as easily as at laparotomy, and the diagnostic procedure can be combined with tubal patency tests, curettage and gynecography. However, culdoscopy has potential if not real hazards and should therefore be used only when standard diagnostic methods fail and when there is no real indication for laparotomy.

Fractures of the jaw—At the annual scientific meeting of the British Medical Association held at Birmingham, Mr. R. O. Walker, who is a highly qualified dentist as well as a surgeon, discussed fractures of the jaw. He stressed the need for universal instruction in first aid, so that an airway can be maintained to prevent suffocation before the patient reaches the hospital. Causes of respiratory obstruction are foreign bodies, a swollen floor of the mouth, and backward displacement of the tongue.

(Continued on page A-92)

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references: (1) Becker, R. M., in Welch, H., and Marti-Ibañez, F.: Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, p. 310. (2) Zimmerman, M. C.: Clin. Med. *5*:305, 1958. (3) Zimmerman, M. C.: J.A.M.A. *167*:1807, 1958.

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Mandibular fractures account for 75 per cent of cases, and the remainder is made up of the more severe fractures of the maxilla. A barrel bandage is the best emergency splint for the lower jaw. This can be followed by eyelet wiring if the teeth are in good condition or by cap splints if the dentition is inadequate for wiring. Edentulous patients should be immobilized by the use of Gunning's splint.

Fractures of the maxilla are more severe injuries and more difficult to treat. The lower jaw is too mobile to use as a splint. Cap splints on the upper teeth, fixed externally to a plastic head cap, have proved the most satisfactory method of treatment.

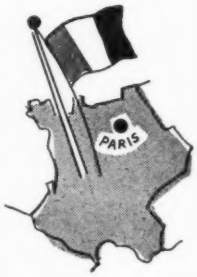
Nutrition should not be a problem in these patients; there is usually a gap between the teeth, but, if that is not present, an adequate fluid diet can be administered through the space behind the last molar tooth. Very careful attention to oral hygiene is vital. Mr. Walker made a plea that such patients be referred early to the dental staff, so that treatment can be begun as soon as possible after injury.

Pilocarpine in the treatment of squint—At a recent meeting of the section of ophthalmology of the Royal Society of Medicine, Dr. John Whitwell read an interesting paper on the use of pilocarpine in treating squints. The average child who begins to squint is usually about two and one-half years old; his foveal central vision is not fully developed and the degree of fusion is limited. He is farsighted, but the ciliary muscle is still not fully developed. There are, therefore, two defects of accommodation: a static defect, hyperopia, and a dynamic defect, maldevelopment of the ciliary muscle. In addition, numerous childish ailments, such as whooping cough or measles, are liable to involve the ciliary muscle in the general debility, thus adding to the dynamic defect.

An interested child will squint violently in an effort to overcome his weakened accommodation. A miotic fixes the accommodation for short distances without any nervous intervention, and thus dispenses as much as possible with the frontal accommodation reflex. Pilocarpine seems to be the most useful drug; the usual initial dosage is 1 per cent eye drops three times daily in both eyes. This dosage level is maintained for at least a month and is continued until a less frequent application controls the squint; then the treatment is gradually withdrawn. Whether or not the treatment will be successful is apparent after the first or second drop, and it is useless to continue treatment if the squint is not controlled.

Pilocarpine alleviates fully accommodative squints in three ways. First, it locally sets the accommodation for short distances so that the frontal reflex is not brought into use. Secondly, the associated miosis, by providing a far greater depth of focus, makes it unnecessary for the child to exercise as much accommodative effort to see a clear close image. A third possible factor is that the constant spasm of the ciliary muscle causes the muscle to strengthen and hypertrophy. This would tend to remedy one of the principal original causes of the squint, namely, a dynamic defect of the accommodation.

FRANCE



New ideas on breast cancer—Professor F. Ducuing of Toulouse commented in a recent issue of *Journal de radiologie d'électrologie et de médecine nucléaire* on the results obtained by the use of operative surgery, radiotherapy and hormones in cases of breast cancer.

In surgery there are two opposing trends: simple mastectomy strictly limited to the site, which is favored by McWhirter of Edinburgh, and radical mastectomy which includes the removal of both the supraclavicular and internal mammary lymph nodes.

As to radiotherapy, the school of thought at the Radium Institute of Paris (the Curie Institute), with Baclesse, opposes McWhirter's doctrines. The British surgeon believes that radiotherapy should be postoperative and directed on the area of the lymph nodes. Baclesse thinks that x-ray may "sterilize" breast tumor. However, irradiation of lymph node lesions remains a gamble, and when it is used in the axillary area it provokes painful pulmonary lesions. Baclesse, like Lamarque of Montpellier, believes that some day radiotherapy may be sufficient in treating breast cancer, but because present technics are imperfect and because no one has the right to rely on the probability of good results, it remains necessary to operate on the stage 1 and 2 cancers and then to complete the cure by radiotherapy. At stage 1 there is no urgency. At stage

(Continued on page A-94)

a new type of effectiveness in depression and fatigue states

... Anti Depressant Deaner®

p-acetamidobenzoic acid salt of 2-dimethylaminoethanol

The effects of 'Deaner' are unlike those of other energizers. After coming on gradually, effects are prolonged...*free from* hyperirritability, jitteriness or emotional tension...*free from* excessive motor activity...*free from* loss of appetite...*free from* elevation of blood pressure or heart rate ...*free from* sudden letdown on discontinuance of therapy.

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has proved to be of value in the alleviation of a wide variety of emotional disturbances.[1] It is indicated in

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- migraine
- neurasthenia
- behavior problems and learning defects in children

'Deaner' produces greater daytime energy, better ability to concentrate, and a more affable mood.[2] It promotes sounder sleep.[2] In children it enhances adaptability and lengthens attention span.[3]

Dosage: Initially, 1 tablet (25 mg.) daily in the morning. Maintenance dose, 1 to 3 tablets; for children, ½ to 3 tablets. Full benefits may require two weeks or more of therapy. 'Deaner' is supplied in scored tablets containing 25 mg. of 2-dimethylaminoethanol as the *p*-acetamidobenzoic acid salt.

Another Riker *First*

NORTHRIDGE, CALIFORNIA

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2. Murphree, H. B., Jr.; Jenney, E. H., and Pfeiffer, C. C.: 2-Dimethylaminoethanol as a Central Nervous System Stimulant, Presented before Assoc. for Research in Nervous and Mental Disease, New York, Dec. 12-14, 1957. To be published.
3. Oettinger, L., Jr.: Presented before the American Encephalographic Society Meeting, Atlantic City, June 14, 1958. To be published, Journal of Pediatrics.

2 there is an emergency, but operation should be avoided when the tumor is in full evolution.

The hormonal cure is nothing but a curiosity, and Ducuing cautions against excessive systemic therapy with the male hormone.

He believes that all women should be carefully observed, small biopsies should be done more frequently, and all menacing lumps should be excised early. This is a step toward the preventive treatment which ought to be the guiding thought in operative surgery of breast cancer.

Professor P. Marques, a radiologist of Toulouse, is concerned with cancers which are inoperable either because of their local extension or because of the patient's general poor health (J. radiol. et électrol. 39:43 [January] 1958). Without trying to claim adequacy for his statistics, he listed a three year survival rate of 74 per cent for patients with stage 1 and 2 cancers and 29 per cent for those with stage 3. Mortality is highest in the first postoperative year.

Dargent of Lyons has reported attempts to stop advanced metastasizing cancers by excising the adrenal glands (Semaine hôp. Paris 20:515 [December] 1957). He operated on 44 patients who had secondary lesions in the bones, lungs, lymph nodes or liver. Six patients survived more than six months, and 16 survived from two to six months. Three deaths were attributed to the operation. He found that metastases in the liver do not disappear, and those in the lung rarely do so, but bone metastases often fade away.

Adrenalectomy is not indicated unless other methods have failed or cannot be performed. Then, under the protective cover of cortical therapy, the vigilance starts. Before attempting this surgical procedure, Dargent even demands proof that castration also has failed to help.

The adrenalectomy should be bilateral; however, Dargent tried excising only the right adrenal. He transplanted the left adrenal into the spleen by cutting its veins, but preserving its arterial and neural peduncle. The result was the same as after a double adrenalectomy; however, postoperative corticotherapy was not necessary.

In discussing breast cancers, let us recall here the attempts of Coste of Lyons, who in about 1930 was treating epitheliomas with a single, very large dose of superficial massive radiotherapy limited to the tumor; the lymph nodes were not treated unless lesions developed in them. He counted a fairly good number of successful treatments, thus becoming a precursor and pioneer in this field.

NETHERLANDS

Care of patients following gastrectomy—In the seventh yearbook on cancer research and treatment in the Netherlands, Dr. R. G. A. van Wayjen described the care of 57 agastric patients following gastrectomy for cancer of the stomach. Malnutrition, common in such patients, was relieved by increasing food intake, improving protein utilization, and treating postoperative disturbances. Balance studies showed that the calorie loss in the feces was not much greater than in normal persons. Food intake was increased by giving the patients frequent small meals which had a high calorie, fat and protein content. As a rule, protein utilization was normal in this series of patients; when necessary, it was considerably improved by giving androgens. Routine administration of iron and liver extracts prevented postoperative hypochromic or hyperchromic anemia.

Retrosternal burning caused by reflux esophagitis or stenosis of the esophageal suture was the chief postoperative disturbance. A spontaneous cure usually occurred in cases of esophagitis, and bougienage was effective in relieving stenosis. The dumping syndrome, which rarely occurs after total gastrectomy, was present in only one of the 57 patients.

Carcinoma of the bladder—A section of the yearbook is devoted to a review of procedures followed in treating carcinoma of the bladder at the Radiotherapeutic Institute in Rotterdam. Superficial stage 1 carcinomas are resected transurethrally. Infiltrating tumors up to 5 cm. in size without evident metastases are treated by implanting radium in the tumor area during operation. (Radium implantation in the open bladder has been used in Rotterdam since 1950.) Tumors larger than 5 cm. and those with marked metastases are irradiated with telecobalt.

From 1951 to 1957, patients treated for carcinoma of the bladder (excluding papillomas) included 115 men and 43 women. The men's average age was 62 and the women's 66. Radium puncture was used in 87 patients; 73 were cured, five obtained relief, and nine had relapsing car-

(Continued on page A-96)

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Phenylephrine Tannate	25.0 mg.
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Suspension—each 5 cc. contains:

Phenylephrine Tannate	5.0 mg.
Prophenpyridamine Tannate	12.5 mg.
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TABULES: Usually 1 or 2 tabules each 12 hours.

SUSPENSION: [PEDIATRIC]:

Adults, children 6 yrs. and older, 1 to 2 teaspoonfuls each 12 hours; under six years, according to age. Dosage may be increased or decreased as required.

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TABLE 1

1956 MORTALITY FROM MALIGNANT TUMORS

LOCATION	PER CENT OF DEATHS	
	Men	*Women*
Stomach	0.18	0.12
Colon	0.05	0.06
Rectum	0.04	0.03
Respiratory organs	0.17	0.02
Mammary glands	0.01	0.12
Prostate gland	0.07	
Female genital organs		0.08
Urinary organs	0.04	0.02
Leukemia and Hodgkin's disease	0.035	0.03
TOTAL (other sites included)	0.77	0.64

cinoma. Seventy-one patients were treated by roentgen rays; 50 obtained relief, metastases occurred in 18, and relapsing carcinoma in three. It was estimated that 38 per cent of patients who received radium therapy had a chance of five year survival; only 2 per cent of those who had to be treated by roentgen rays because of the extent of the tumor or metastases could expect to live for five years. The tumor's diameter influenced the prognosis. The likelihood of a five year survival following radium puncture was 60 per cent when the tumor was less than 3 cm. in size and only 11 per cent when it measured more than 6 cm.

Mortality from malignant tumors—Statistics collected by L. Meinsma show that in the Netherlands mortality from malignant tumors rose from 0.55 per cent in 1901 to 0.71 per cent in 1956, with the greatest increase, 0.55 to 0.70 per cent, occurring between 1901 and 1911. Table 1 shows the 1956 mortality from malignant tumors.

SPAIN

Public health—The Director General of Public Health Dr. Jesus Garcia Orcoyen has reported the status of public health in Spain to be satisfactory, especially in reference to the incidence of infectious disease. The last significant incidence was the epidemic of influenza in September 1957, when more than two million doses of

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vaccine prepared in Spain were administered. Exanthematous typhus and smallpox have disappeared, not a single case having occurred in several years. Cases of malaria were reduced to 1,101 in 1956; in some past years a million cases have been reported. Improved treatment has greatly reduced the number of deaths from typhoid, but incidence of the disease will continue high until sanitary conditions are improved. While the number of tuberculosis cases remains the same, the disease now causes fewer deaths. Some cases of poliomyelitis occur each year, but the number is not comparable with that in the United States, England or the Scandinavian countries. Although there is a slight increase in the incidence of this disease, mass vaccination is not indicated at the present time.

The most satisfactory progress is seen in the reduction of infant mortality from 116 per 1000, which represented 70,000 deaths per year of children less than one year of age, to 45 per 1000, or less than 30,000 per year, in spite of an increase of three million in total population.

The number of tuberculosis sanatoriums has increased from 12 in 1936 to 68 at present, and there are 154 dispensaries and rural health centers in the provinces of Spain. The incidence of leprosy has decreased through modern treatment in the Trillo National Leprosy Institute, the San Francisco de Borja Institute in Fontilles, and the provincial institutions.

Dr. Carlos Jiminez Diaz, Madrid, believes that the improvement in public health is due to improved medicines, better diagnoses and surgical progress.

Dr. Carlos Branco Soler noted that the number of persons more than 50 years of age has increased from 13.5 per cent in 1768 to 20.5 per cent in 1950. The longer life span poses a problem for state institutions. Patients with psychoses of senility constitute 50 per cent of those admitted to mental institutions.

The Infant and Maternity Health Program of the Directorate General of Public Health has established well-equipped dispensaries and clinics throughout the country. In county seats and in towns of 5000 population there are maternity centers with approximately 10 beds each, a delivery room and facilities for surgery. More than one-third of the Spanish population is enrolled in the obligatory sickness insurance program, and of the 550,000 children born in Spain each year, 210,000 receive medical care from pediatricians and doctors trained in puericulture.

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1. Crumpacker, E. L., et al., AMA Arch. Int. Med., 98:314.
2. Palmer, E. D., "Clinical Gastroenterology" Hoeber-Harper.

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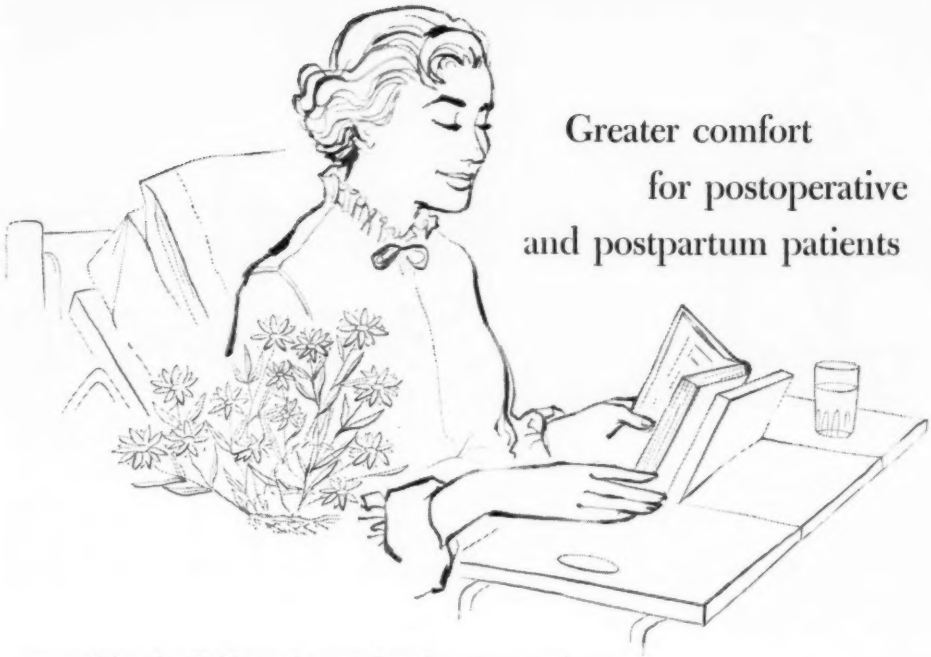

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Administration and dosage: may be given prophylactically or therapeutically after surgery or childbirth. Usual oral dosage: 10 to 30 mg. three or four times daily. Usual subcutaneous dosage: 5 mg. three or four times daily.

Other indications: gastric atony and retention following vagotomy and other surgical procedures; chronic functional urinary retention due to atony without obstruction; megacolon, including congenital megacolon (Hirschsprung's disease); certain cases of paralytic ileus; to counteract side effects of antihypertensive ganglionic blocking drugs.

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The Knowledgeable Nose

(Assessed by Charles Rolo in *The Atlantic Monthly*)

"My liberty is absolute," said the nihilist to the Englishman. "There is nothing which prevents me from punching you in the nose if I wish to." "Oh, yes, there is," replied the Englishman. "Your liberty ends where my nose begins."

The Analyst's Couch

No self-respecting neurotic will undergo psychoanalysis today without informing his friends that he is either "hitting the couch" or "couching it." The couch is as necessary a piece of choice equipment for the doctrinaire analyst as the scalpel is for the surgeon, the stethoscope for the internist or general practitioner, or the ophthalmoscope for the ophthalmologist. Since the couch represents the orthodox fiat that a patient is better off in the horizontal position, what does an analyst look for in a couch?

Comfort, for the most part, reported Gerald Walker in the *New York Times Magazine*. He told of the time Sigmund Freud visited the newly furnished office of a fellow analyst who had just begun to practice in Vienna. The furniture was new and expensive, in fact, opulent. The couch itself was probably the widest one Freud had ever seen. Freud stared at it in lengthy silence, then turned to the novitiate analyst and said, "I see that you are going in for group analysis." Taste in couches, however, can run in the opposite direction. One analyst used a couch so narrow and difficult to move about on that a fellow practitioner couldn't resist asking him why he hated his patients so much.

The current price for a psychoanalyst's couch varies from $85 for a simple headrest affair with no arms or back to $350 for a hydraulically operated de luxe model with push-button controls that raise and lower the patient's head and feet to any desired position. The knowing interior decorator who is consulted on matters connected with furnishing an office will avoid prescribing for the couch fabrics that have little nubbly ends protruding. It seems that a patient may sometimes take his feelings out on the couch and literally pick it to pieces. Leather couches are passé—they're just too slippery for patients who shift about nervously. It can hardly help anyone's analysis if he finds it necessary to pick himself off the floor.

"Once a psychoanalyst does get precisely the kind of couch he wants," concluded Walker, "he usually hangs on to it for a long time, like a baseball player with a lucky bat. Freud used the same ornate couch throughout most of his long professional career. Theodor Reik's present couch came with him from Vienna in 1938, averaging one reupholstering for every

(Continued on page A-110)

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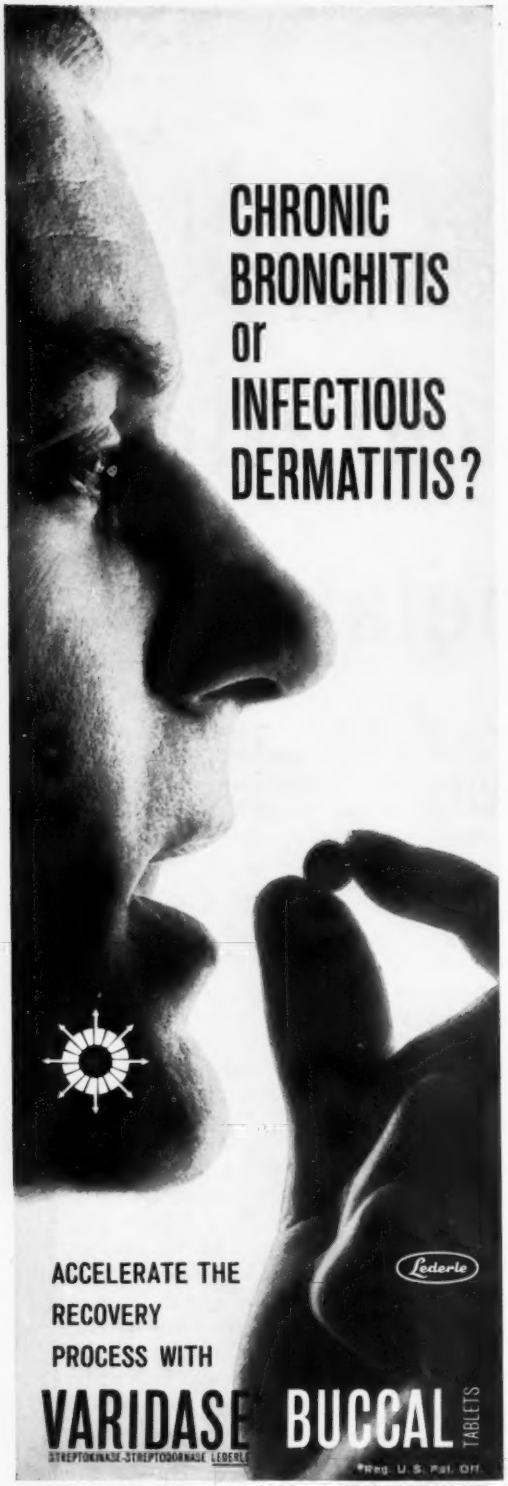

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five years of use. Clara Thompson's dates back to 1934 (with two reupholsterings), and the Persian spread on top of it to 1925. Given this rather cautious attitude toward change, it begins to look, what with one thing or another, that patients may come and go but the analyst's couch goes on forever."

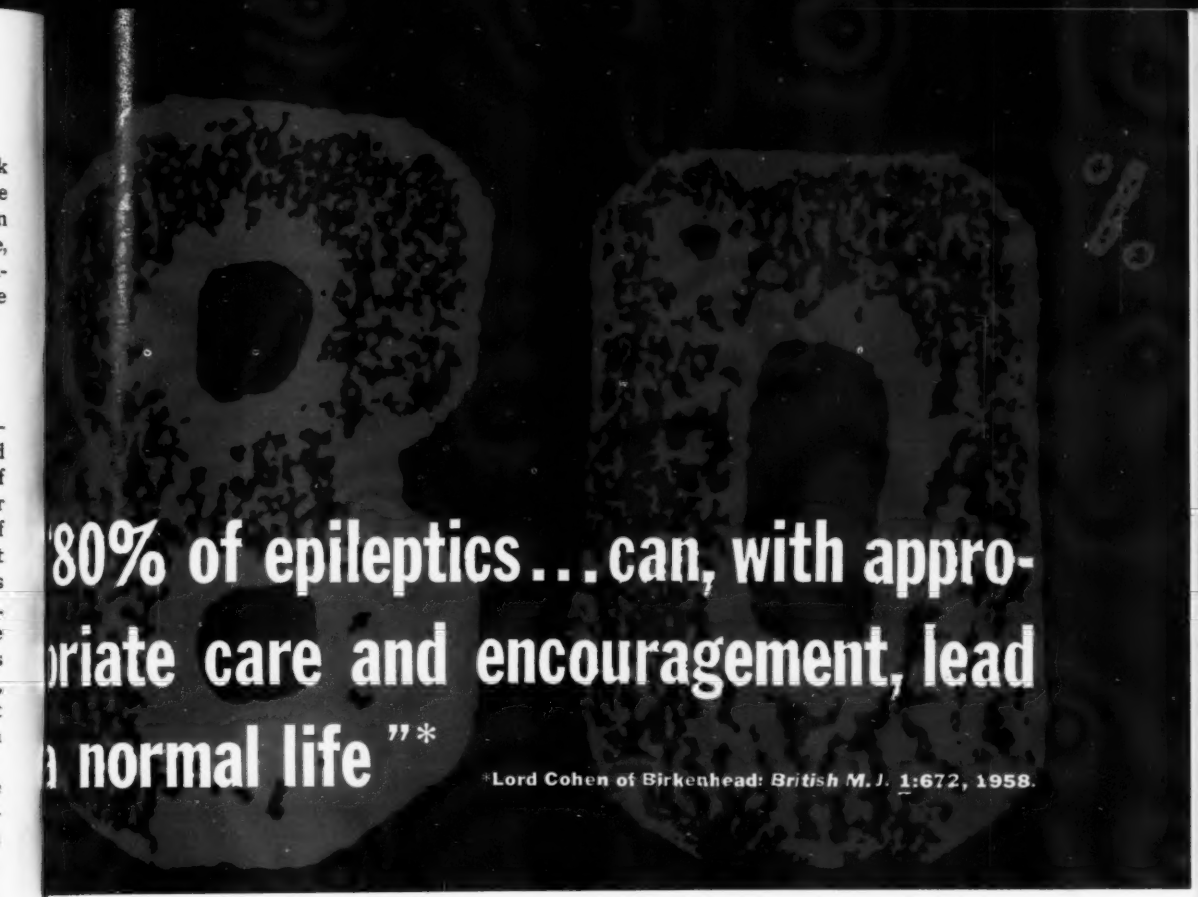
The Medical Humor of George Jean Nathan

When George Jean Nathan died after having been a critic for 50 years, there passed from the scene an encyclopedic observer of the theater and an iconoclastic commentator on the foibles of our day. As an associate of H. L. Mencken, a partnership that was to last through two decades, his by-line became as well known on Main Street as on Broadway. Together, as editors of the *Smart Set* and the *American Mercury*, they jeered at stuffiness and cant, tossed decorum out of the window, and belabored all kinds of sacred cows, not only in literature and the theater but also in public morals and university education.

A bright blend of intellect and impudence characterizes Nathan's work. His writing bristles with epigrams and paradoxes, and in this respect he can be called, up to a point, the American Oscar Wilde. Scattered through his work are references to medicine and doctors—amusing, witty, critical, devastating. He can be read either for sheer humor or for the truth—as seen through his eyes.

"The trouble with doctors," said Nathan, "is that they seldom admit that anything stumps them. When they don't know what is wrong with you or how to establish a cure, they invariably proceed to mask a guessing contest as science." For several years, Nathan had neuritis in his right arm and sought medical counsel from various "big pill and pulse men." "Not one hesitated a moment in his diagnosis of my trouble," he declared, "although the diagnoses had all the variety of an old-time vaudeville bill!" One doctor said it was due to sleeping with his right arm under him, although he had slept on his left side since cradle days. A second claimed the difficulty was due to high acidity, which subsequent tests showed he didn't have. A third, after three months of prescribing electric pads, heat rays and muscular massage, insisted the neuritis was caused by a sesquipedalian term

(Continued on page A-112)



'80% of epileptics . . . can, with appro-priate care and encouragement, lead a normal life"*

*Lord Cohen of Birkenhead: *British M. J.* 1:672, 1958.

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of reference which the doctor didn't bother to explain. The only cure, announced the doctor, was more heat rays, electric pads and muscular massage, therapy that had not accomplished anything in three months. "When I mildly protested," commented Nathan, "he took off his glasses, eyed me majestically and observed that he could do nothing for me if I didn't believe in his treatment."

"Then there is exercise," continued Nathan. "Either you are overdoing it or you are not doing enough of it, depending upon how much news on the subject the doctor has succeeded in slyly coaxing out of you. 'Exercise is a good thing in moderation, but it mustn't be overdone'—that also puts you back $10. If you are in the habit of playing 18 holes of golf, cut it down to nine; if nine, raise it to 18—no matter how you feel or where the seat of your trouble lies. Then, people don't drink enough water these days, it appears. It has cost me hundreds of dollars to learn this, although I have always drunk enough water daily to float a rowboat. 'But,' I have protested, 'I already drink all the water I can hold!' Undismayed and unruffled has come the reply, 'Well, drink more.'"

Related Nathan: "I had an uncle, now dead, who for many years was bothered by a burning sensation on his tongue. It didn't amount to much, but it worried him and he patronized many doctors in this country and abroad in an effort to learn what caused it. The doctors diagnosed the trouble as this and that and prescribed various treatments which my late lamented relative took, each and all to no avail. One day, eight years after he began consulting doctors and taking their futile treatments, he happened to mention the burning sensation to an old German bartender in a well-known Philadelphia comfort parlor of the period. 'Put half a teaspoonful of salt in a glass of warm water and wash your mouth with it about six times a day and you'll be all right again in a few days.' My uncle followed the bartender's instructions and the burning sensation on his tongue disappeared."

Millions of words have been written during the past few decades on the virtues and demerits of downing an alcoholic beverage. These arguments are familiar to most of us. Less familiar, however, is Nathan's attitude on the subject. "I drink," he declared, "to make other people interesting."

The Diagnostic Use of Radioactive Isotopes

1. BACKGROUND AND GENERAL ASPECTS

CHARLES A. OWEN, JR.*

Mayo Clinic and Mayo Foundation, Rochester, Minnesota

DESPITE the fact that "artificial" (man-made) radioisotopes are less than a quarter of a century old, they are becoming firmly established biologically and industrially.

CHARLES A. OWEN, JR.

Biologically, the radioactive elements already have opened a number of closed doors. In chemically undetectable amounts, they can be measured by their radiation. The radiation may be quantitated without destroying the radioactive chemical, so that a consecutive series of chemical manipulations can be followed. Most important from a medical point of view, the radiation can be measured at some distance from its source, permitting the quantitation of isotopes within the living person.

*Section of Clinical Pathology, Mayo Clinic and Mayo Foundation, Rochester, Minnesota. The Mayo Foundation is a part of the Graduate School of the University of Minnesota.

Application of Radioisotopes

For diagnostic purposes, the goal of radioisotopic use is not irradiation; this falls into the province of the radiologist who makes therapeutic use of radiation. Diagnostically, the less the effect of radiation on tissues the better, for the real goal is to follow biologic pathways. Here the rays are merely the tools for quantitating the rates.

As an example, several samples of blood drawn over a period of an hour or so would show negligible change in the concentration of calcium. If radiocalcium were given to the patient intravenously, it would be seen to disappear rapidly from the blood. This must mean that calcium is being added to the blood at the same rapid rate it is leaving in order for the net concentration to remain constant. If

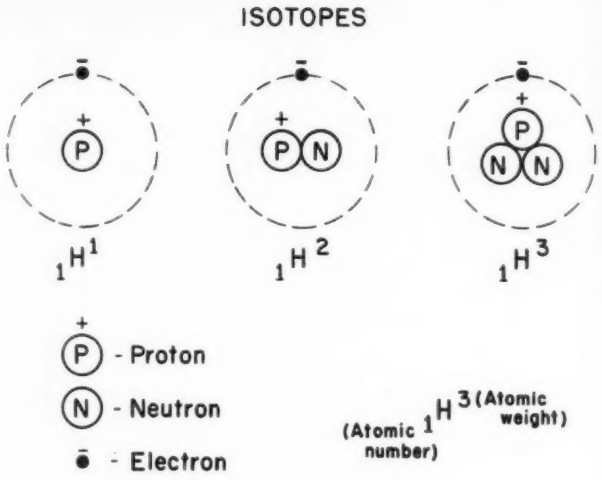

FIGURE 1. Diagrammatic representation of the three known isotopes of hydrogen. All three contain one proton (P+), which identifies them as hydrogen (H); the weights vary as no neutron, one or two neutrons (N) are added to the nucleus. One negatively charged electron is in orbit about the nucleus.

(From Owen, Charles A., Jr.: Diagnostic Radioisotopes, 1958. Courtesy of Charles C Thomas, Publisher, Springfield, Illinois.)

one knows the rate at which calcium leaves the blood (from the radiocalcium data) and the concentration of calcium in the serum, it is possible to calculate precisely how much stable calcium is entering and leaving the blood stream, which is the "turnover rate."

Using other mathematical devices, one can estimate a bodily "space" by the extent of dilution that a particular radioisotope undergoes within the body. One may determine where a radioactive substance tends to accumulate (as radioiodine in metastatic lesions of thyroidal carcinoma) by means of an external in vivo counter. The time required for an isotope to go from a vessel in an upper extremity to one in the foot is a simply measured example of circulation time. The contour of the curve of radioactivity over the heart after an intravenous injection of an isotope may be converted into a measure of cardiac output.

These and many other uses of radioisotopes have been proposed. Some of these are too new to have been evaluated completely. Some need too elaborate equipment for the amount of information to be derived. A few tests have found a firm place in the diagnostic laboratory. In part 2 of this presentation will be discussed the most commonly used radioisotope, namely, radioiodine for the study of thyroidal function; part 3 will be concerned with several isotopes of particular interest in the field of hematology; part 4 will take up other proposed uses of various radioactive elements and compounds.

Principles of Radioactive Radiations

For purposes of simplification, the structure of the atom will be assumed to consist of only three kinds of particles. These are (1) the proton, an extremely heavy particle with a positive electric charge that resides in the nucleus of the atom, (2) the electron, an extremely light, practically weightless, negatively charged particle that swings around the nucleus in a fixed orbit, and (3) the neutron, which lacks either electric charge but is extremely heavy because it has the properties of a proton (+) as well as an electron (−).

The weight of any particular atom is determined by the sum of its protons and neutrons. However, the chemical identity of the atom depends solely on the number of its protons. One could imagine several atoms all chemically identical but differing in weight because of the varying number of neutrons. This phenomenon actually occurs, and the various atoms of one chemical element are called "isotopes," which are classed as radioisotopes or stable isotopes according to whether or not they emit rays.

The simplest example of the isotopes of one element is the hydrogen family, for the atoms of this element contain only one proton. Three isotopes of hydrogen are known (figure 1).

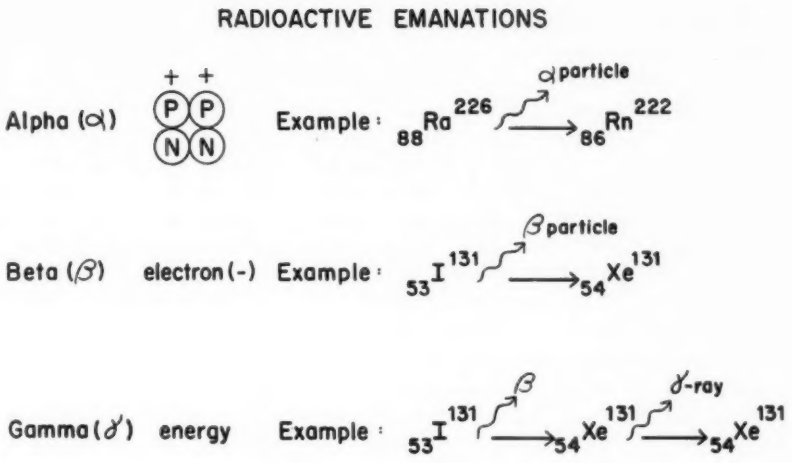

FIGURE 2. Diagrammatic representation of the emission of an alpha particle (from radium), a beta particle (from radioiodine), and a gamma ray (secondary to the beta particle from radioiodine). P^+ stands for a positively charged proton, N for the uncharged neutron.

(From Owen, Charles A., Jr.: Diagnostic Radioisotopes, 1958. Courtesy of Charles C Thomas, Publisher, Springfield, Illinois.)

Hydrogen ($_1H^1$) and deuterium, or heavy hydrogen ($_1H^2$), are examples of stable isotopes, but the addition of the third particle to the nucleus renders tritium ($_1H^3$) unstable and, therefore, radioactive. The conventional symbols are shown under the diagrams in figure 1. The letter is the chemical symbol, whereas the subscript to the left represents the number of protons and the superscript to the right indicates the sum of protons and neutrons, that is, the weight of the nucleus. Since the number of protons, by definition, determines the chemical nature of the atom, to write "$_1$H" is redundant, for the "1" and the "H" say the same thing. However, in calculating nuclear changes, it is convenient to express the number of protons, since it is not easy to remember the number in each of the 102 elements which are known.

It must be remembered that all the nuclear particles obey physical laws: Electrically charged masses attract oppositely charged masses and repel like charges; the various nuclear bits exert gravitational and magnetic attractions; they are spinning rapidly, so they have centrifugal and centripetal forces. These and other atomic properties tend to hold the atomic bits together as well as thrust them apart. If the bonding is sufficiently strong, the atom will remain unaltered and is said to be stable; if the bonding is weak, sooner or later reorganization will occur, associated with a radioactive emanation and inevitably a chemical (protonic) change.

The degree of instability varies from one radioisotope to the next and leads to an extremely important characteristic of all radioactivity, namely, a completely inflexible rate of decay of radioactivity for each isotope. This decay rate cannot be altered by any chemical or common physical manipulation, such as heat, cold, pressure or distillation. It is so exact that if one knows how much of a particular isotope is now present he can tell precisely how much was present at some earlier time or how much will remain at some future time.

If the decay rate, or the diminution of radioactivity, is plotted on ordinary graph paper, a curved line results; if it is plotted on semilogarithmic paper (the log scale being used for the amount of radioactivity and the arithmetic scale for time), a straight line is formed. This means that if a radioactive element decays by half in eight days it will not decay the other half in the next eight days but only one-half more, or a total of three-fourths in 16 days, seven-eighths in 24 days, fifteen-sixteenths in 32 days, and so on. This leads to a handy way of expressing the rate of radioactive decay, namely, the "half-life," or the time required for any amount of a certain radioisotope to be reduced by one-half. Half-lives of the isotopes vary from millionths of a second to billions of years.

Of the various radioactive rays, only three—alpha, beta and gamma—are used medically, and only the latter two are employed for diagnostic purposes (figure 2).

The beta ray is an electron coming not from the outer electron orbits but from the nucleus itself, from the electrically neutral neutron. The neutron (in effect a proton plus an electron), having lost its negative charge (the electron), becomes a positively charged proton. The atom has not changed significantly in weight by the loss of an electron, but it has lost one neutron and added one proton. It is, therefore, a different chemical element from what it was a moment before; it is now one place lower in the chemical periodic table.

The beta particle, because it is an actual amount of matter, has only limited penetrability in water or tissue, and even in air. Sooner or later it collides with other atoms and transfers its energy by ionizing the obstructing atoms. This makes possible its detection in the Geiger-Müller counter, for the GM counter along with its attached recording equipment is designed to record the number of ionizing events occurring during some clocked period of time. This leads to the conventional way of expressing measured amounts of radioactivity, namely, counts per minute (cpm, or c/m) and counts per second (cps, or c/s).

Some atoms are completely stable after the beta particle has been emitted; examples are carbon-14 (C^{14}), phosphorus-32 (P^{32}), sulfur-35 (S^{35}) and calcium-45 (Ca^{45}).

After an unstable atom has ejected its beta particle, it may remain momentarily in an "excited state." This induces the emission of an electromagnetic ray of extremely short wave length, or a gamma ray. The atom then loses its excitation and tends to become stable. Since a change has not occurred in the neutrons, protons or electrons of the atom, it is chemically the same after discharge of the gamma ray as it was before.

Examples of radioisotopes emitting both beta and gamma rays are iron-59 (Fe^{59}), iodine-131 (I^{131}) and cobalt-60 (Co^{60}), all of which have diagnostic usefulness.

The present-day method of measuring gamma rays involves conversion of their short wave lengths into the longer wave lengths of light by means of scintillation chemicals. The luminescence of the numerals on the dial of a watch (from the rays of radium) or on the fluoroscopic screen (from x-rays) represents conversion of invisible to visible photons. In the diagnostic radioisotope laboratory, crystals made of sodium iodide that is tainted with a trace of thallium are commonly used for this purpose.

The quantitation of radioactivity needs not only the detecting device or "counter" but also a sensitive electronic "scaler" to record the number of rays observed during some fixed period. It then becomes a matter of simple arithmetic to convert the observations to "counts per second."

Radiation Hazards

The dangers of radiation fall into two areas: (1) the danger to the person himself from internal or external sources of radiation and (2) the danger to the person's progeny because of genetic alterations in his reproductive cells.

If a person receives sufficient radiation, he will certainly die, as will all life. The tolerable limit varies from animal to animal and from plant to plant. In the case of man, a single dose of about 500 roentgens (r*) is considered to be lethal for about 50 per cent of exposed persons. If the exposure is less than 100 r, few people will die. After sublethal doses, effects may be observed in the bone marrow (depression), intestinal tract (inflammation), lung (congestion), eye (cataract) and gonad (sterility). Cancer of the lung is common among the uranium miners of Central Europe; leukemia has occurred on occasion in persons exposed to large amounts of x-rays and in survivors of atomic warfare, and cancer of the skin has been a relatively common finding in the pioneer roentgenologists.

Probably a more important question is the

*The unit (r) of the effect of radiation is a measure of the number of ionizations created in air by roentgen or isotopic rays; various "roentgen equivalents" have been coined to indicate the number of ionizations in water and, therefore, presumably in tissues ("rep" for "roentgen equivalent physical" and "rem" for "roentgen equivalent man").

effect of extremely small doses of ionizing radiation on the human being. Since large doses produce visible changes and larger doses are known to be more injurious, it is popularly believed that small doses are damaging in proportion to the dose. However, little evidence exists that this extrapolation is valid, and there are even suggestive data that minute doses of radiation may prolong the life of experimental animals.

The data with regard to the genetic effects of radiation are clearer, for extensive studies on the fruit fly and the mouse are at hand. Little reason exists to believe that man differs qualitatively from these other forms of animal life. It is reasonably certain that no dose of radiation is too small to cause some genetic change. Theoretically, one ray striking the appropriate molecule of nucleoprotein of one gene in one sperm could lead to a mutation. However, humans are now being bombarded with internal (potassium-40, radon, carbon-14) and external (cosmic, radium, uranium, thorium) rays to the extent of about 1.5 r per decade. The average citizen of the United States is receiving an additional roentgen per decade from medical and dental x-rays. He is likely to receive 1/30 r per decade from the testing of nuclear bombs (fall-out) if the present rate of detonations is maintained. As a result, it becomes difficult or impossible to assess the effect of additional fractions of a roentgen that a person may receive from any individual radioisotopic test.

If one recalls the potential hazard of any radiation, it is a safe rule to impose added radiation on any patient only if some direct or indirect gain appears possible. It is obvious that any qualified investigator will protect his laboratory personnel by every known means.

Authorization for Use of Radioisotopes

The fundamental principles of isotopic radiation are not generally taught in medical schools, and only recently have they been added to training programs for residents. The equipment used to measure radioactivity is foreign to most physicians. The biologic effects of radiation are generally familiar only to radiologists. Accordingly, it might appear logical to place the use of radioisotopes in the radiologist's hands. However, most roentgenologists are little interested in the diagnostic isotopes because the methods are essentially those of the laboratory rather than of the x-ray department. As a result, the responsibility for these laboratories has fallen to whatever physician expresses an interest in the field. It appears likely that the clinical pathologist should and eventually will add the radioisotopic tests to the other diagnostic procedures currently in his province.

Because of the potential hazard of the radiation from radioisotopes, strict regulations have been imposed by the United States Atomic Energy Commission to insure that only trained persons may obtain and use these isotopes. For example, to qualify for the diagnostic use of radioiodine, the candidate, a licensed physician, must have received specific training in an accredited laboratory using this radioisotope. The training includes the requirement of a minimum of 30 hours of personal experience in the laboratory with a minimum of 10 patients undergoing testing with radioiodine. Unfortunately, too often this is the only requirement that candidates notice. Overlooked are the following conditions (The Medical Use of Radioisotopes: Recommendations and Requirements by the Atomic Energy Commission; Isotopes Extension, Division of Civilian Application, U. S. Atomic Energy Commission, Oak Ridge, Tennessee):

"Basic radioisotope training shall provide the physician a working knowledge of

"1. Principles and practices of radiological health safety.

"2. Radioactive measurement, standardization and monitoring technics and instruments.

"3. Mathematics and calculations basic to the use and measurement of radioactivity.

"4. Biological effects of radiations."

Some workers in this field consider that 30 hours is an inadequate period in which to fulfill these objectives.

Commercially Available Radioisotopes

Most of the medically useful radioisotopes in this country are produced by the Atomic Energy Commission at Oak Ridge, Tennessee.

These are available to the medical profession through pharmaceutical houses, which prepare the isotopes in sterile, readily usable form.

The isotopes are derived for the most part from the bombardment of certain elements with neutrons emanating from "enriched" uranium. The addition of a neutron to the atom renders it radioactive in one of several ways, namely, simple addition, addition of a neutron followed by rapid decay to a new element, or chemical transformation during addition of the neutron.

The uranium, as it decays by loss of neutrons, breaks down into a series of smaller elements that may be separated chemically and be made available for use.

A less accessible source of radioisotopes is the cyclotron. This device accelerates protons and permits the bombardment of elements with a stream of the accelerated particles.

Comment and Conclusions

Various radioactive substances have been made available to the physician in the past decade. Some of these are being employed in the treatment of disease, such as radiophosphorus for polycythemia vera, radiogold for certain serosal malignant lesions, and radioiodine for overactivity or carcinoma of the thyroid. Others, employed in minute amounts, are being used to measure abnormal metabolic pathways for diagnostic purposes.

The physician interested in the diagnostic applications of the radioisotopes is confronted by a new vocabulary as well as by electronic instruments and physical principles for which he is not prepared. These basic considerations have been reviewed briefly.

Part 2, "Radioiodine and thyroidal function," will be published next month.

Postgraduate Clinical NOTES

100. MENTALLY RETARDED CHILDREN

A great part of the problem of retardation is directly related to the introduction of children to formal education, a process involving abstract intellectual ability. Many retarded children, who do poorly in school, upon becoming adults are able to merge into the total adult population. They can perform jobs which do not have exacting intellectual requirements and they can function like other workers around them. This is true, however, only of mildly retarded individuals who, fortunately, constitute the majority of the group. Probably 75 per cent of the mentally retarded have an IQ ranging from 50 to 75. Experience shows that with help this group can become a part of the community. The children in this group usually appear normal at birth. During the preschool years, they show only slight deviations in developmental patterns. As a rule, their retardation becomes most obvious during the first year or two at school. They generally do well in special classes.

The more severely retarded, those with an IQ of less than 50, can frequently be recognized in early life by clinical signs associated with mental retardation. Marked deviation from normal developmental patterns is noted earlier in life. Parents today have considerable awareness of the more prominent aspects of development during the first two or three years of life. When a child is slow in developing or is obviously retarded, it is to the family doctor or pediatrician that the parents come to find out what is wrong and what they can do about it.

Arthur S. Lesser, New program for mentally retarded children, *American Journal of Public Health and the Nation's Health*, January 1958, pp. 9-14

Current Trends in Treatment of Laennec's Cirrhosis and Its Complications

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THE treatment of Laennec's or portal cirrhosis is primarily nonspecific and supportive. Patients are seen in all stages of the disease, but those who have severe symptoms and signs invariably will require long-term treatment.

General Measures

Rest—Rest is the first and most important consideration. Specific indications for complete bed rest are jaundice, ascites or edema, and precoma somnolence. Progressive weakness and debility often force the patient to stop work and go to bed before a physician's advice is sought. The benefits to be derived from bed rest include decreased metabolic demands on the liver and increased blood flow to the liver.

Diet—The diet that we prescribe for the average patient consists of 120 gm. of protein, 370 gm. of carbohydrate and 120 gm. of fat. The current thought is that fat should be permitted as long as it does not interfere with sufficient intake of protein and carbohydrate. The meals are presented in the usual three main servings and three additional feedings. The daytime additional feedings are best given no more than one hour after main servings so as not to interfere with the following meal. This may seem to be a minor matter, but it nevertheless is a significant point, since one hour after a meal a patient seldom is hungry and is surprised at the amount of food he can consume.

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The amount of food urged on the patient will of course vary somewhat with his size. Not all patients can tolerate the caloric con-

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TABLE 1

TUBE FEEDING WITHOUT PROTEIN RESTRICTION

FOOD	UNIT	PROTEIN (gm.)	CARBOHYDRATE (gm.)	FAT (gm.)	SODIUM (mg.)
Evaporated milk	2 cans	58	81	65	822
Eggs	2	12	0	12	140
Lactose	80 gm.	0	80	0	0
TOTAL		70	161	77	962

Total calories approximately 1600. Total volume approximately 1000 ml.

Water should be added if the mixture is too thick.

Low sodium feeding: Use low sodium milk products with appropriate dilutions.

tent prescribed without becoming obese. On the other hand, the sight of excessively large servings may aggravate the patient's distaste for food. The patient's eating habits are closely observed in an effort to alter the diets individually. For those patients whose appetites are better at breakfast and lunch, the main meat servings may be presented at those two earlier meals. A diet diary should be maintained from which the caloric and also protein, carbohydrate and fat intake can be calculated. The values are charted daily for the hospitalized patient.

A 10 per cent solution of dextrose or levulose (invert sugar), or both, may be given intravenously late in the day if the food intake has been insufficient. Insulin need not be used with this and, except in cases of insulin deficiency, probably is an undesirable agent for stimulating the appetite. Tube feedings (tables 1 and 2) may be used in those cases in which anorexia is severe, but they seldom are practical for more than a brief period of time and many traumatize varices and cause hemorrhage. If nausea and vomiting are severe, protein hydrolysates may be safely used parenterally, as recently developed preparations do not cause serious reactions if they are administered slowly. A program of frequent feedings between meals is followed in all cases in which steroid therapy is used.

Alcohol—Many of the patients whom we see with portal cirrhosis have used alcohol excessively. The use of alcohol must be forbidden. No compromise should be allowed in this matter since the large majority of these pa-

TABLE 2

LOW-PROTEIN TUBE FEEDINGS

ITEM OF DIET	GRAMS	PROTEIN (gm.)	CARBOHYDRATE (gm.)	FAT (gm.)	SODIUM (mg.)
Fat emulsion*	300	0	36	162	2.4
Protein-mineral concentrate†	30	18	7	1	1.8
Lactose	120	0	120	0	0
Strained orange juice‡	900	0	90	0	27.0
Water	500				
TOTAL	1850	18§	253	163	31.2

Total calories, 2,551.

*The values given are for the fat emulsion EDIOL®. A somewhat comparable product is LIPOMUL®.

†The values given are for the protein-vitamin-mineral concentrate GEVRAL® Protein. Somewhat comparable products are PROTENUM®, SOMAGEN® Solubilized, and SUSTAGEN®.

‡This amount of orange juice may cause some diarrhea. One of the aluminum hydroxide or the kaolin preparations may be used to counteract this effect.

§This amount can be readily varied simply by varying the protein concentrate.

tients are not satisfied with "just a drink now and then," and the use of alcoholic beverages often will interfere with a satisfactory diet.

Vitamins—Vitamin supplementation has been criticized as adding little to a good diet; however, variations in patients' absorption and assimilation of vitamins warrant their administration. One of the therapeutic multivitamin preparations that contains approximately 10 mg. of thiamine, 10 mg. of riboflavin, 100 mg. of nicotinic acid, and 150 mg. ascorbic acid is given two or three times a day. Five milligrams of vitamin K is administered orally once a day in cases in which the prothrombin time is prolonged. Since water-soluble preparations of menadione sodium bisulfite (HYKINONE®) and menadiol sodium diphosphate (SYNKAYVITE®) are available, it is not necessary to give bile salts to facilitate absorption.

Lipotropic agents—The use of lipotropic agents has been criticized on the same grounds as vitamin supplementation. Since there is no definite objection, and since evidence suggests that they have a favorable effect on a fatty liver, it seems desirable to use lipotropic agents in all cases in which the patients tolerate them well. We administer 1 or 2 gm. of choline dihydrogen citrate three times daily.

Liver extract is administered intramuscularly once or twice a week. The usual dose is 1 or 2 ml. of the crude liver extract. In more severe stages of cirrhosis with jaundice, fever, ascites and somnolence, we often have given liver extract (INTRAHEPTOL®) in a dextrose solution.[1] The preparation is given in a definite course in a two or three week period of hospitalization. After a test has demonstrated that the patient is not sensitive to this preparation, a dose of 1 ml. is administered intravenously, and this dose is increased gradually until a dose of 10 ml. is reached. This dose is administered daily for one week; thereafter, it is administered three times a week depending on the patient's response. In the past year, we usually have added 1 gm. of ascorbic acid to the dose of liver extract. The response to this type of treatment has been good in many cases. This response has been characterized by a return of appetite and a sense of well-being.

Androgens are used in many of our patients. A long-acting agent such as testosterone cyclopentylpropionate is administered intramuscularly once a week in doses of 100 to 150 mg. Significant hirsutism has not been observed in cases in which we have used this preparation. The principal objection raised is that the nitrogen retained thereby is lost later on when such therapy is discontinued; however, if the patient improves significantly, the loss probably is not important.

Corticotropin and corticosteroids occasionally may be of value in the treatment of cirrhosis, but the use of these agents usually is avoided because of the sodium retention and the increased frequency of peptic ulcer. The newer steroids have less effect on electrolytes but may have greater ulcerogenic activity. We have preferred to administer liver extract and ascorbic acid intravenously in cases in which the disease is severe. Nevertheless, in cases in which active parenchymal disease is unresponsive to other measures, one may administer steroids as a trial.

Corticosteroids have been reported to have been of benefit in the treatment of coma associated with severe hepatitis,[2] and they, therefore, are preferable to corticotropin. When treatment is started, 75 to 100 mg. of cortisone may be administered intramuscularly every six hours, but the dose is quickly reduced depending on the response. If the history suggests that the patient has a peptic ulcer, antacid therapy is used. If the patient recently has had a peptic ulcer, the advisability of steroid therapy is questionable unless heroic measures are warranted and the risk is understood. As mentioned previously, frequent between-meal feedings are recommended in all cases in which steroid therapy is used.

Toxic reactions to drugs—Toxic reactions to drugs are a real problem in the treatment of hepatic disease. Toxic hepatitis is part of the pathologic picture produced by the administration of excessive doses of innumerable drugs or by sensitivity to such drugs. Only a few of these drugs will be mentioned. If sulfonamides and antibiotics are well tolerated, they may be administered in standard doses when necessary. Arsenic is hepatotoxic, and it is to be found in dermatologic and hemato-

logic remedies. The use of chlorpromazine hydrochloride probably should be avoided. If nausea and vomiting are excessive, promazine hydrochloride and the antihistaminics or anticholinergics may be administered. Since methyltestosterone may cause jaundice, its use should be avoided except in those cases in which the agonizing pruritus of biliary cirrhosis or obstructive jaundice is relieved only by this drug.

Sedatives are poorly tolerated. Barbital and phenobarbital, which are excreted chiefly by the kidneys, are preferred instead of other barbiturates. Chloral hydrate and paraldehyde have been said to be contraindicated, but we have used chloral hydrate frequently without apparent difficulty. Morphine is poorly tolerated. Codeine or meperidine hydrochloride should be used when necessary. One-half the usual dose or less should be given initially, and repetition of this dose should be delayed longer than usual.

Complications

Edema and ascites—Often these are presenting complaints. The general program of treatment might be expected to have some beneficial effect, but, unfortunately, a liberal, unrestricted diet may lead to a worsening of these signs. In fact, edema and ascites may be first noted shortly after treatment has been started. Then, a low sodium diet is necessary. A diet containing 0.5 to 1 gm. of sodium usually is sufficient and permits adequate protein intake. Occasionally, the sodium intake must be limited to 200 mg. per day. Less meat then must be used and much of the protein must be given in the form of one of the low sodium milk protein products such as LONALAC®, Sustagen and Gevral Protein.

The diet may be made more attractive and palatable with vinegar, honey and lemon juice. Some patients are satisfied with the salt substitutes available, and for many others these are useful in the transition period to a low salt diet. Most condiments and spices including pepper are best avoided.

The patient's medications must be reviewed for possible excessive sodium in sodium bicarbonate, sodium salicylate or some proprietary remedy for indigestion. Artificially softened water and special flavoring agents may contain appreciable amounts of sodium. Diuretics were used long before the principles of the low sodium diet were common knowledge. Occasional patients still may be treated with diuretics without restriction of sodium. In some cases, moderate restriction of sodium to 1 or 2 gm. and occasional diuretics suffice. In cases of severe cirrhosis, drastic restriction of sodium intake and frequent use of diuretics usually are necessary, but the possibility of the development of the low-salt syndrome in the patient must be kept in mind.

MERCUHYDRIN® or a similar preparation is administered in doses of 1 or 2 ml. once or twice a week. It may be used every other day or even daily for a few days. Occasionally, we have administered as much as 4 ml., but the possibility of mercurial toxicity prevents repeated use except under close observation if the patient's renal function is good. Ammonium chloride formerly was used frequently to potentiate the action of mercury. More recently, this procedure has been avoided because of reports[3] of hepatic coma produced by ammonium chloride. Calcium chloride has been used in place of the ammonium compound, but it is somewhat irritating to the gastrointestinal tract. A dose of 3 gm. is administered three times a day. It is best given in milk to mitigate irritation. Potassium chloride may be administered orally in doses of 1 gm. along with each dose of calcium chloride to minimize the hypokalemia that may follow diuresis.

The cation exchange resins are not satisfactory in the treatment of cirrhosis. The bulkiness of the resins interferes with adequate intake of food; moreover, the ammonium-cycle resins have been reported to have caused coma.

Parenteral administration of albumin may be used for its nutritional effect as well as for its possible diuretic effect. The cost of this material, however, makes its use impractical, and the results are uncertain; occasionally it can be obtained from the American Red Cross. Often, but not invariably, patients seriously ill with cirrhosis complicated by ascites respond favorably. A course of treatment con-

sist of the intravenous administration of 25 gm. once a day for 10 days. Slow administration of the solution will tend to prevent complications such as pulmonary edema and hemorrhage from esophageal varices.

Abdominal paracentesis should be avoided. However, when ascites seriously interferes with the patient's breathing or appetite, or disturbs his rest greatly, it must be relieved. Removal of part of the ascitic fluid often is sufficient, and aids in diagnosis. In some cases, repeated paracentesis is necessary. *One should avoid aspirating all of the ascitic fluid present because coma may be precipitated by aspiration of all the fluid.* The fact that the patient tolerates the paracentesis well is no assurance that he will not lapse into coma the following day. We recently have observed an extreme change of personality the day after paracentesis, with slow return to normal after a period of somnolence.

Hemorrhage—Esophageal varices most often are diagnosed only after hemorrhages have occurred, but occasionally diagnosis is made on the basis of roentgenographic findings without a history of hemorrhage. The treatment then is essentially the same as in other cases of cirrhosis. If there is a past history of hemorrhage or of peptic ulcer, a strict ulcer-type program,[4] including frequent feedings alternating with the administration of antacids and an anticholinergic such as methscopolamine bromide (PAMINE®) or propantheline bromide (PRO-BANTHINE®), has produced favorable results. The diet as stated is a bland ulcer-type diet. Treatment is designed to prevent peptic ulceration of the varices by inhibiting the secretion of acid with the anticholinergics and neutralizing with the antacids that which is formed. This program should be continued until there is definite improvement in the hepatic disease. Should any indication of coma appear, a lower protein intake is recommended.

Hemorrhage from esophageal varices is one of the most dangerous complications of cirrhosis and requires intensive treatment. A very cautious attitude always is justified. The patient is put to bed and observed closely for signs and symptoms of continued hemorrhage. Apprehension, nausea and rapid pulse are suggestive, but more obvious signs are shock, frequent tarry stools and hematemesis. Careful recording of frequent observations including the blood pressure and pulse rate is of course fundamental in such a situation. Blood transfusions usually are advisable if the value for the hemoglobin falls below 10 gm. per 100 ml. A surgical consultation should be arranged, and the surgeon, along with the attending physician, should follow the patient's progress. Thus surgical treatment will be more quickly available when indicated.

Diagnostic details are not included in this paper, but it should be stressed that emergency roentgenographic examination of the upper part of the gastrointestinal tract with a barium meal may give vital information. The examination for varices and the study of the stomach and duodenum are safe if no palpation is used. The severely ill patient, actively bleeding or in shock, should first receive emergency treatment, but in such instances roentgenographic study may be made within a few hours if the patient improves.

A major factor in the causation of coma complicating hemorrhage probably is the ammonia formed by the breakdown of blood in the intestinal canal. Thus a primary consideration is evacuation of blood from the stomach and intestine. In all cases, unless special contraindication exists, a laxative such as castor oil or magnesium hydroxide is given by mouth (or through the tube used in esophageal tamponade), and later an enema is administered.[5]

If bleeding has been mild and does not recur, treatment is begun as in cases of bleeding peptic ulcer.[4] Administration of antacids is alternated hourly with feedings of milk and cream. Anticholinergics and sedatives are given. The other measures applicable to cirrhosis, already discussed, are commenced as soon as practical. The patient is closely observed for the onset of coma. If coma occurs, the administration of all protein by mouth is stopped, and treatment for coma is instituted.

If hemorrhage is massive, continuous or recurrent, in addition to blood replacement, esophageal tamponade usually is required, such as with a Sengstaken-Blakemore tube

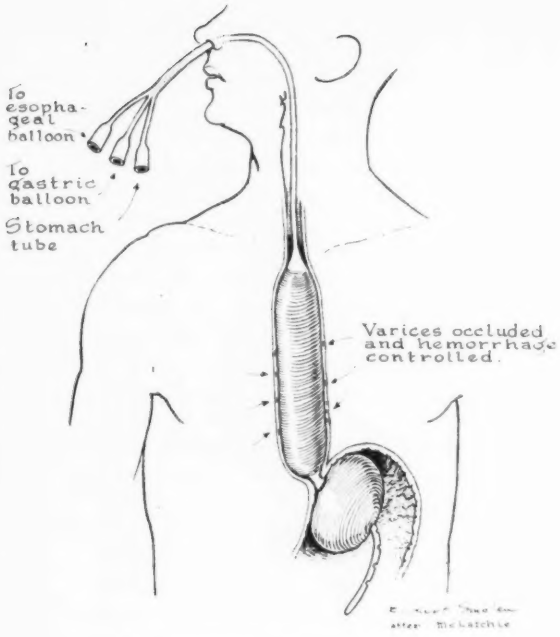

FIGURE 1. Sengstaken-Blakemore nasogastric tube.

(figure 1). Each tube should be checked for defects before use. These include excessive rigidity of the balloon preventing sufficient distention and also the presence of thin, extremely distensible areas which preclude the maintenance of a satisfactory pressure. Before the tube is passed, air should be evacuated from the balloons with a syringe, and clamps should be applied to the outlets. This will facilitate passage by reducing the bulk of the tube.

The tube is passed nasally, preceded by a local anesthetic spray of the turbinates if necessary. When in place, the gastric balloon is distended to a volume of 200 ml., as an insufficiently distended balloon may be regurgitated and obstruct breathing. The gastric balloon is then firmly drawn up to the cardia, and the esophageal balloon is distended to a pressure of about 30 mm. of mercury. Retching at this pressure usually will be relieved by the anticholinergic drugs. The pressure is determined every 15 minutes in the first hour. Determination of pressure along with the other details will require that constant care be given the patient.

When esophageal tamponade has been established, attention is directed to the blood in the gastrointestinal canal. The stomach is aspirated and irrigated. A cathartic is given through the tube; thereafter, constant suction is applied and the patency of the tubes is rechecked periodically. As previously mention, an enema is given later.

Traction on the tube in an effort to compress gastric varices causes excessive retching and may be followed by severe erosion of the gastric wall. Although esophageal tamponade is reasonably safe for several days and has been used intermittently for long periods in some cases, traction tamponade for more than 24 hours may lead to early complications. Thus the end of the tube is simply taped to the patient's face or forehead to prevent passage of the esophageal balloon downward. The balloons are left inflated for from 48 to 72 hours, and then the pressure is gradually reduced. If bleeding does not recur, the tube may be withdrawn after a few more days.

Blood transfusions are almost invariably necessary if severe hemorrhage occurs. Fresh blood is desirable to supply labile clotting factors, and also because the ammonia content of blood stored over a few days may be toxic for the patient with poor liver function. Vitamin K should be given parenterally. Two milligrams of menadione, 5 mg. of Hykinone, or 5 mg. of Synkayvite may be administered intramuscularly once a day. If these doses fail to increase the prothrombin activity, 70 to 75 mg. of Hykinone or Synkayvite may be given intravenously, or vitamin K_1 (MEPHYTON®), given slowly by the intravenous method, may be still more effective. Further depression occasionally follows such treatment, and is presumed to be a rebound phenomenon caused by depletion of hepatic prothrombin without re-formation. Administration of vitamin K then is discontinued for a few days and fresh blood is used if hemorrhage recurs. If the prothrombin activity remains at about 70 per cent of normal, as it does in many cases, repeated large doses of vitamin K need not be

given, although the daily administration of a small dose may be continued.

During the period of constant gastric suction, the patient is maintained by the intravenous administration of dextrose in physiologic saline solution or in water; potassium may be added if indicated. The problems of fluid and electrolyte balance necessitate careful tabulation of intake and output and periodic determination of the values for the serum electrolytes. A hypochloremic alkalosis may follow constant gastric suction. This may be corrected with a 5 per cent solution of calcium chloride (100 to 200 ml.) administered intravenously, since ammonium chloride is contraindicated. Calcium chloride must be injected slowly because of possible myocardial depression. Vitamin B complex is added to the fluids in amounts equal to the doses previously stated in the general program for cirrhosis.

To control the intestinal bacteria thought to be active in the formation of ammonia from the blood contained in the intestine, 250 mg. of chlortetracycline hydrochloride is administered through the gastric tube four times a day or 500 mg. is administered intravenously every 12 hours. Two hundred and fifty milligrams of neomycin sulfate may be administered through the tube four times a day. When this drug is used, penicillin should be administered parenterally in an effort to prevent secondary infection.

Severe distention of the abdomen caused by ascites favors continued hemorrhage from varices. The distention may be partially relieved by paracentesis. Satisfactory esophageal tamponade may prevent such hemorrhage. Furthermore, as previously stated, the possibility of inducing coma interdicts more than partial withdrawal of ascitic fluid.

After from 24 to 48 hours, tube feedings are commenced. Constant suction beyond this period is impractical because of the fluid and electrolyte problems. Tube feedings (tables 1 and 2) may be alternated with the administration of antacids. A low protein diet is used to minimize the possibility of hepatic coma. The patient is observed repeatedly for somnolence or flapping tremor.

The surgical management of bleeding esophageal varices is a broad problem and is not discussed in detail in this paper. Brief consideration, however, is necessary. Emergency operation must be considered for every patient with severe hemorrhage. A surgeon should see such a patient early enough to permit some procedure to be done, if indicated, before the condition becomes extreme.

Transthoracic ligation of esophageal varices may be lifesaving if control of bleeding by esophageal tamponade is ineffective,[6] or if bleeding occurs when tamponade is discontinued. In those cases in which blood appears in the gastric drainage repeatedly or melena occurs, the possibility of a gastric or duodenal lesion may make laparotomy necessary. Esophagoscopy should precede laparotomy in all such cases.

In cases of advanced cirrhosis, operation may be too dangerous, although it apparently may be indicated. If jaundice is present, if the value for the serum albumin is less than 2.5 gm. per 100 ml., or if ascites is present, the wound may heal poorly. In such instances, a careful supportive program very likely will prove to be as successful as an elaborate surgical procedure.

In most cases of advanced cirrhosis in which the presence of a bleeding gastric or duodenal ulcer is suspected because of continued hemorrhage, the patients are treated medically. Aspiration of gastric juice is alternated with the administration of antacids through the gastric tube already in place. The pressure in the esophageal balloon is released and the tube is withdrawn as soon as it is apparent that there is no variceal bleeding. Only if the hepatic function is not greatly impaired should operation be attempted.

A portacaval shunt is to be considered as an eventual definitive measure in certain cases in which bleeding has occurred from esophageal varices. It is especially indicated in cases in which repeated hemorrhage has occurred after transthoracic ligation of varices if hepatic function is not greatly impaired. A discussion of the evaluation of liver function in the selection of patients for portacaval shunt may be found in Schiff's "Diseases of the

Liver."[7] It should be emphasized, however, that a patient who improves sufficiently on a medical program to be a good risk for such an operation may also do well on continued medical treatment.

Hepatic coma—Hepatic coma is the most feared complication of cirrhosis. The prognosis is, however, quite variable depending on the precipitating factor. Coma occurring without apparent cause often terminates fatally, while that associated with hemorrhage, administration of ammonium chloride or acetazoleamide, infection and paracentesis may sometimes show striking reversal following treatment directed toward the etiologic factor or mechanism involved.

Following hemorrhage or administration of ammonium chloride, patients are observed closely for signs of impending coma. Somnolence, inappropriate behavior and flapping tremor are especially significant. Patients who have such signs as well as those who lapse into coma without such precipitating factors are, however, treated similarly.

Constant attention, with detailed charting of intake and output, frequent evaluation of the state of consciousness, and alertness for other complications form the basis of therapy. All oral administration of protein is discontinued for at least several days. In the precoma stage, 250 mg. of chlortetracycline hydrochloride or neomycin sulfate may be given orally every six hours to arrest ammonia formation by intestinal bacteria. If coma is present, 500 mg. of chlortetracycline hydrochloride is given every 12 hours for the same purpose as well as to prevent the secondary infection from which the patients often succumb.

A 10 per cent solution of invert sugar in distilled water, which has been fortified with relatively large amounts of vitamin B complex, is administered intravenously. One hundred milligrams of thiamine, 100 mg. of riboflavin, 400 mg. of nicotinic acid, and, in addition, 500 mg. of ascorbic acid are added to each liter of fluid that is being infused. If output is sufficient, 2 or 3 l. of solution may be given during each period of 24 hours.

Treatment with l-glutamic acid should be considered in practically all cases of hepatic coma.[8] There is less reported experience with l-arginine but initial reports have been enthusiastic.[9] Glutamic acid combines with ammonia to form glutamine, while arginine is thought to bind ammonia in the urea cycle. Therefore, these agents would be expected to be most useful in cases of acute coma in which an excess of ammonia can be demonstrated or is considered a factor. They are not so effective in acute coma occurring in the end stage of cirrhosis, but merit trial.

Twenty-five grams of sodium and potassium glutamate or arginine hydrochloride is given in 500 ml. of a 5 or 10 per cent solution of dextrose in distilled water. The solution is given in about two hours and may be repeated three or four times a day, while decreasing the amount of other fluids that are being administered intravenously. This treatment may be continued for from two to four days, while awaiting beneficial effect. If none occurs in that period, later response is unlikely, but intermittent therapy may be used if a response is obtained.

Since the use of the glutamic salt provides an excessive amount of sodium and potassium, this treatment is limited by fluid and electrolyte imbalances. Arginine has not been shown to disturb electrolyte balance significantly, although it is administered as the hydrochloride salt. Further experience is necessary to evaluate the results of administration of both of these amino acids, but no objection is apparent.

Persistent coma without response to therapy presents a difficult problem. Eventually, parenteral alimentation proves impractical. A tube must be passed into the stomach to permit tube feedings, although some risk is involved. The protein content is very low during the first few days in accordance with the possibility of "protein intoxication" as a possible etiologic factor of coma. However, nutritional requirements eventually will necessitate increased protein (tables 1 and 2).

Hepatorenal syndrome—Occasional instances of anuria or reduced urine flow have been seen in association with jaundice and coma in cases of hepatic cirrhosis. Those patients in whom anuria is a terminal event

seldom can be significantly benefited by therapy. However, acute coma and anuria require special treatment. Limitation of fluid intake and avoidance of protein are the basic considerations. The protein-sparing action of dextrose is important. We have seen very beneficial effects from dialysis by using the Kolff artificial kidney. Early consideration, therefore, must be given to this treatment.[10]

Resumption of Activity

When to permit the patient to begin to resume activity poses a problem. Economic and psychologic factors sometimes force the physician's hand but, in general, one must restrain the overly optimistic patient—and at times resist his family. The patient's occupation obviously affects the decision. Sedentary activities are permitted long before more strenuous exertion. The general rule is to wait until there are satisfactory, stable, unchanging physical and laboratory findings. Thus, a normal retention of BROMSULPHALEIN®* is desirable, but, if a retention of 10 or 15 per cent persists for one month, activity gradually may be resumed. Fever, ascites and jaundice should have subsided, but activity may be permitted when there is only minor elevation of the value for the serum bilirubin (up to 3 mg. "total" per 100 ml.), if it fails to decline over a one month period of observation.

The cephalin-cholesterol and thymol turbidity tests are too sensitive to use as criteria for resumption of activity, since they may remain positive long after other symptoms and signs have regressed. One of the most important signs of improvement in liver function is an increase in the value for the serum albumin. This should be at least above 2.5 gm. per 100 ml. and preferably above 3.0 gm. before the patient is permitted to resume normal activity. Finally, observation of the patient's clinical progress will determine when he may become more active.

*This test is not reliable if jaundice is present.

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Benign Diseases of the Uterine Fundus

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BENIGN disorders of the uterine fundus, exclusive of infections, make up a large part of gynecologic practice and frequently are both misdiagnosed and mismanaged. A review of the most common of these conditions should serve to clarify their diagnosis and outline their management. Table 1 is a simple classification listing the order of their discussion in this paper.

Mucosal Hyperplasia

Various synonyms have been applied to this condition in the past. The most common ones are glandular hypertrophic endometritis, hemorrhagic metropathy, and glandular hypertrophy of the endometrium. A preferred term is hyperplasia of the endometrium or mucosal hyperplasia of the uterus.

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History—Olshausen[1] in 1875 first described this condition as an inflammatory process, but in 1882 Brennecke[2] stated that he felt it was a noninflammatory hyperplasia. Hitschmann and Adler[3] in 1907 demonstrated its relation to cyclic menstrual disorders.

Etiology—Recent work has demonstrated that endometrial hyperplasia is a response to uncontrolled, excessive and uninterrupted estrogen without the intermittent production of progesterone. Frequently there are associated microcystic changes in the ovaries with an irregular follicle-ripening process. The corpus luteum usually is absent, and if it is present it is poorly developed. Postmenopausally, one abnormally large follicle which does not rupture may cause endometrial hyperplasia.

Pituitary function is also involved in this disorder. Frequently an excessive amount of follicle-stimulating hormone is produced, stimulating the ovaries to develop the immature, irregularly ripened follicles. The condition may result from prolonged exogenous administration of follicle-stimulating hormone, and frequently it develops after attempts to stimulate ovulation.

Benign tumors such as granulosa tumors and benign feminomas of the ovary similarly may exert an estrogenic effect on the endometrium, resulting in hyperplasia. Excessive intake of estrogen is perhaps the most common precursor of endometrial hyperplasia in the postmenopausal period.

Occurrence—Endometrial hyperplasia is most common in the climacteric age group, with adolescence and the childbearing period following in order of incidence. It is rare after the menopause except in association with granulosa tumors or estrogenic therapy, and it also is rare prior to adolescence.

Symptoms—The usual presenting symptoms are prolonged and frequent menses and intermenstrual bleeding. The bleeding of endometrial hyperplasia tends to occur toward the end of the menses and in this sense prolongs the menstrual flow. At times, amenorrhea is present for a varying period due to persistently elevated secretion of estrogen without the concomitant irregular fall necessary for the phenomenon of withdrawal bleeding. Infertility is frequently associated with the disorder.

Pathology—The endometrium is markedly thickened, measuring from 15 to 25 mm. Occasionally the mucosa is normal in thickness or even thinner than normal, but the histologic picture is similar to that of thickened endometrium. The endometrium is uneven, with capillary polypoid mucosal tufts, and has the appearance of a spongy mucosal layer. It is sharply delineated from the myometrium unless adenomyosis is also present.

Microscopically there is a proliferative "Swiss cheese" appearance, as described by Novak.[4] The glands are cystically dilated and tortuous, and the tubules are arranged somewhat erratically. Gland inversion is common. The mucosal cells usually are of low cuboid or high columnar type in single or double layers. Many benign-appearing mitoses may be seen. The stroma underlying the mucosa is compact and shows proliferative activity. It is somewhat edematous, and there are frequent mitoses as well. The uterine vessels are strikingly hypertrophic and hyperplastic.

These histologic changes may be limited to sharply localized areas and thus result in formation of single polyps, but more often the changes are diffuse. Novak and Rutledge[5] described an atypical hyperplasia with an increased number of atypical glands, stratification and abnormal staining, and squamous plaques in the walls of these glands.

TABLE 1

CLASSIFICATION OF BENIGN DISEASES OF THE UTERINE FUNDUS

Hyperplasias (non-neoplastic)
Mucosal hyperplasia
Adenomyosis
Myometrial hyperplasia
Neoplasms, benign
Endometrial polyp
Myoma and fibromyoma
Lipoma, osteoma and chondroma, hemangioma and lymphoma

Diagnosis—The history of patients with endometrial hyperplasia frequently reveals infertility. Follicle-stimulating hormone or estrogen may have been given for prolonged periods. Menses are irregular or excessive with a greater flow than normal. Postmenstrual staining is not infrequent.

Laboratory procedures for diagnosis include cytologic evaluation (figure 1), endometrial biopsy, hysterography, and dilatation and curettage. Cytologic evaluation of a vaginal smear reveals hypercornification, the result of persistent and prolonged estrogenic effect. There should be little progesterone effect, which is manifested by rolled, folded and clumped precornified cells. Endometrial biopsy is a simple office procedure requiring a minimal amount of equipment, and there are few side effects related to its performance. It will demonstrate the typical histologic pattern of endometrial hyperplasia.

Hysterography is becoming more widely available.[6,7] Carefully made and interpreted hysterograms may show a typical shaggy polypoid endometrium (figure 2). Dilatation and curettage, of course, represent the definitive diagnostic technic and frequently serve to interrupt the irregular bleeding cycle of endometrial hyperplasia, in this sense serving both

FIGURE 1. Exfoliative cytologic smear showing hypercornification frequently associated with prolonged and excessive estrogenic stimulation.

for diagnosis and as a temporary therapeutic measure.

Treatment—Treatment of endometrial hyperplasia depends largely on the age of the patient, intensity of the bleeding, and degree of anemia. In young women and girls, administration of progesterone in a dosage of 50 to 100 mg. per day for three days at four week intervals will decrease the bleeding and may solve the problem for an extended period. If bleeding is excessive, androgenic therapy may be offered to suppress bleeding in a short time. Testosterone propionate, 50 mg. per day for four days, or methyltestosterone, 20 mg. for five days, may serve this purpose without the necessity for hospitalization and dilatation and curettage. If progesterone and androgen fail to control the bleeding, or if it is grossly excessive, requiring transfusions, dilatation and curettage are indicated.

In middle-aged or menopausal women the incidence of malignant disease of the endometrial cavity is higher, and for this reason one should perform dilatation and curettage earlier in the course of the disorder. After diagnostic procedures such as cytologic examination, endometrial biopsy and hysterography have been carried out, one should first perform dilatation and curettage for diagnostic purposes and then one may await its therapeutic effects. Use of progesterone, as already outlined, or testosterone, or both, frequently results in regression of symptoms and control of the problem. Some workers have suggested radiation of the hypophysis as an approach to endometrial hyperplasia, but it is not widely used. Partial wedge resection of the ovaries has proved useful, particularly in the presence of the Stein-Leventhal syndrome. Amenorrhea is more common in the latter condition than excessive menstrual flow.

In postmenopausal women, endometrial hyperplasia represents a condition of hyperactivity of the endometrium with excessive stimulation in an age group where endometrial carcinoma is not infrequent. The possibility of estrogen-secreting ovarian disease deserves strong consideration, and for this reason abdominal exploration as well as dilatation and curettage are important. Most observers recommend and perform dilatation and curettage to rule out endometrial malignancy, followed by abdominal hysterectomy and bilateral salpingo-oophorectomy when indicated. Radium has been inserted to control the condition, but this measure does not permit adequate examination of the adnexa and is a less desirable means of treatment.

Adenomyosis (Endometriosis Interna)

Synonyms for adenomyosis have included direct endometriosis, adenomyoma, adenomyositis, endometrioma, adenomyohyperplasia, hysteroadenosis, fibroadenomatosis, and adenoma endometrioides. The most widely accepted term at present is adenomyosis, whose definition is simply ectopic intramural uterine endometrium.

History—Russell[8] in 1899 first described endometriosis involving the ovary. Two years earlier, von Herff[9] (and Pfannenstiel) had noted cervical endometriosis. In 1921, Sampson[10] began publication of a lifelong study of many aspects of both internal and external endometriosis. His work remains a monument to pertinacity and sustained interest in a specific disorder.

Etiology—Over the past few years, numerous authors have expressed active interest in

the etiology of endometriosis. Adenomyosis has been related to excessive stimulation of endometrial glands or proliferation of the glands deeper in the uterine walls. TeLinde and Scott[11] demonstrated in monkeys that endometrium desquamated at the menses is capable of implantation and sustained growth, supporting Sampson's theory.

It is likely that several factors cause *external* endometriosis, among them (1) implantation of desquamated menstrual endometrium, (2) metaplasia of the coelomic germinal epithelium of the peritoneum, and (3) metastasis of endometrial tissue by way of the lymphatics. Adenomyosis, on the other hand, appears to be a localized phenomenon resulting in locally invasive proliferation of the endometrial glands associated with diffuse overgrowth of the myometrium. Cesarean section and tubal ligation as well as cornual uterine resections and myomectomy may offer opportunities for mechanical transfer of endometrial tissue to the deeper portions of the uterine wall and initiate the development of localized endometriosis. Cornual resection of the interstitial portion of the tube reportedly has resulted in a 76 per cent incidence of adenomyosis. As many as 8 per cent of nonoperative specimens of the uterus removed for other reasons contain evidence of adenomyosis, and the incidence rises to approximately 19 per cent in the presence of postinflammatory disease of the tubes. A frequent concomitant of adenomyosis is a benign diffuse overgrowth of the myometrium. It has been suggested that this is the result of the hyperestrinism that stimulates the development of adenomyosis.

Occurrence—Adenomyosis is the most common form of endometriosis, representing about 23 per cent of all cases. Its incidence is highest in the fourth, fifth and sixth decades of life. The youngest reported patient was 19 years of age and the oldest was 68. The average age is 44 years. Multiparas are affected somewhat more often than primigravidas, and uterine fibroids are an associated finding in 5.7 per cent.

Signs and symptoms—The uterus may be uniformly or irregularly enlarged. When abnormal uterine bleeding occurs, it is irregular in character. Menses may be prolonged and somewhat more profuse than normal. Two-thirds of all patients have marked dysmenorrhea in the form of persistent pain that begins before the onset of the flow and continues throughout the menstrual period. It has been suggested that this is due to the increased tension of the uterine wall resulting from extravasated intramural bleeding and also to increased contraction of the hypertrophic muscles in response to hormonal factors that may be important in dysmenorrhea. Backache and bearing-down sensations from the increased weight of the uterus may also be part of the symptom complex. Frequently the menstrual pain is referred to the rectal and coccygeal areas.

FIGURE 2. Hysterogram revealing typical shaggy polypoid endometrium found in endometrial hyperplasia.

Relation to pregnancy—Most women with adenomyosis have a history of normal fertility, and since the condition has its peak of incidence later in reproductive life it is not associated with pregnancy as often as it might be. Gestational changes of the decidual type may be present when adenomyosis and pregnancy occur simultaneously. If the endometriosis is in an advanced stage, atony of the uterus may result in excessive postpartum hemorrhage as well as prolonged labor and uterine inertia. The presence of adenomyosis increases the incidence of rupture of the uterus

during pregnancy or labor because of the anatomic disturbance of the uterine structure. Placenta accreta and adherent placenta with poor separation in the third stage of labor are somewhat more common in association with adenomyosis.

Pathology—The demarcation between the uterine mucosa and muscularis is absent. Proliferation of the mucosal glands and stroma is apparent down into the myometrium, with the glands tending to follow lymphatic and blood vessel channels. The glands may actually invade adjacent tissues. With careful serial sections it is usually possible to follow the course of the deeper-lying mucosal glands to the endometrial surface. The disorder may be diffuse, involving the greater part of the uterine wall. The localized form is often called adenomyoma of the uterus. About half of the patients with adenomyosis have hyperplasia of the endometrium as well. The area of the uterine cornu is frequently involved, and the condition also is commonly associated with leiomyoma of the uterus. The deeper-lying glandular tissues rarely show the changes of the menstrual cycle and usually have a proliferative appearance.

Diagnosis—In women of childbearing age there is a history of menorrhagia which fails to respond to conservative measures, i.e., hormones and curettage. Secondary dysmenorrhea may be an associated finding. In the differential diagnosis of adenomyosis and leiomyoma, a history of average fertility and the finding of asymmetrical, rounded nodules or a large uterine mass suggest adenomyosis.

Examination frequently discloses that the uterus is enlarged, somewhat firm, and sensitive to palpation. It is often fixed and it may be noticeably larger premenstrually than postmenstrually. Since adenomyosis may occur together with external endometriosis, the latter finding may suggest adenomyosis as a primary diagnosis.

It recently has been demonstrated by means of hysterography that small feathery channels communicate with the endometrial cavity, and this has proved a definitive aid in diagnosis (figure 3). Hysterograms also help in differential diagnosis, since they should reveal submucous myomas. In any case the histologic findings after removal of the uterus provide the final diagnostic confirmation.

Treatment—Hysterectomy is required when the patient has signs and symptoms of a degree sufficient to warrant therapy. Hormonal therapy and radiation therapy are rather poor second choices.

FIGURE 3. Hysterogram showing the feathery halo that surrounds the outlined endometrial cavity in adenomyosis. The connection between the deep-lying glands and the endometrial cavity is clearly demonstrated by this means.

Myometrial Hyperplasia (Fibrosis Uteri)

Terms used in the literature to describe this disorder include chronic metritis, diffuse myoma, fibrosis uteri, and congestion fibrosis. The acceptability of these terms is currently under dispute, and discussion will therefore be somewhat limited.

History—The history of this disease is long and involved, and much of the data are unacceptable in the critical light of present-day information.

Etiology—It has been suggested that myometrial hyperplasia is due to persistent hyperemia which leads first to proliferation and later to degeneration of musculature and its replacement by connective tissue.[12] Its origin may lie in congestive vascular disorders, as Taylor[13] suggested, and it may be associated

with psychosexual disorders such as masturbation, dyspareunia and disturbances in sexual gratification. Venous origins have been related to varicosities of the pelvic structures, chronic and fixed retroversion, or sclerosis of vessels of the uterus. In older women, granulosa tumors may be an important factor, leading to estrogen-stimulated hypertrophy of the myometrium. In the presence of intramural or submucous fibroids, a thickening occasionally found in the myometrium may be the result of "work hypertrophy" of the uterus. Chronic infections of the uterine wall related to postpartum subinvolution also may have etiologic significance.

Symptoms—Symptoms related to myometrial hyperplasia are somewhat less clear-cut. The patient may have a sensation of weight or pressure in the lower part of the abdomen or back, and backache. Menses may be increased or prolonged, or both. The diagnosis is difficult and is made by exclusion. The uterus is symmetrical in most cases and a hysterosalpingogram gives normal findings. The willingness of the pathologist to make this diagnosis histologically may determine to some extent the incidence of the disorder.

Treatment—Treatment of myometrial hyperplasia is hysterectomy, since it does not respond to endocrine control. The menorrhagia that accompanies the disorder may be sufficiently grave to warrant surgical intervention.

Endometrial Polyp

Endometrial polyps are frequently associated with endometrial hyperplasia. In the past they have been called adenoma polyposum.

Etiology—Etiologic factors are usually the same for endometrial polyps as for endometrial hyperplasia, and the two conditions often develop simultaneously. Endometrial polyps are often related to excessive and prolonged production of estrogen and a disturbance of the normal cyclic variation in its production.

Pathology—The endometrium usually is proliferative in type and rarely secretory. The polyp shows varying degrees of dysplasia and metaplasia. A common finding is edema of the polyp, with stasis and thrombosis of the vessels leading to hemorrhage from the endometrium and the myometrium. The dysplasia and metaplasia may suggest precancerous changes. Indeed, carcinoma *in situ* of an endometrial polyp has been described in many instances.

FIGURE 4. Hysterogram discloses moderately small endometrial polyp and also demonstrates the pedicle of the polyp.

Symptoms—Uterine bleeding may be slight and irregular in nature and is often described as "spotting." Leukorrheal discharge may be increased. The bleeding, when it occurs in relationship with the menses, is more often premenstrual, and this may help in diagnosis.

Diagnosis—Polyps protruding through the cervical os may be visualized directly on inspection of the cervix. Hysterosalpingograms are distinctly valuable in diagnosing endometrial polyps (figure 4). The most widely used diagnostic approach is dilatation and curettage. Frequently the small stalk from which the polyp arises eludes the exploring curet, and for this reason exploration of the uterine cavity with a small polyp forceps is recommended. I have added exploration with a common duct stone forceps as a routine part of dilatation and curettage. On many occasions, careful curettage with this technic has resulted in discovery of polyps when the curet failed to produce evidence of a single, moderately large polyp.

Relation to endometrial cancer—Both en-

dometrial carcinoma *in situ* and invasive adenocarcinoma of the endometrium have been associated histologically with endometrial polyps. The presence of a polyp in the postmenopausal or menopausal period suggests excessive stimulation of the endometrial lining and a response of the endometrium to the stimulus of neoplastic quality. There is a growing feeling that endometrial polyps may have the same role in the development of endometrial adenocarcinoma as colonic polyps have in the development of adenocarcinoma of the colon. Although the incidence of malignancy in association with endometrial polyps is appreciably lower than that of carcinoma in association with colonic polyps, one should nevertheless keep the relationship in mind in managing the condition. Certainly it suggests that treatment might well be more radical than simple curettage and polypectomy, and hysterectomy is being offered more and more often when contraindications to it are not present.

Myomas and Fibromyomas

Myomas and fibromyomas have been defined as benign, discrete nodular tumors of the uterine wall composed of uterine muscle and fibrous tissue in varying proportions and arranged in a disorderly manner. They have also been called fibroids and leiomyomas.

Frequency—Uterine myomas are the most common tumor of the uterus. Older texts give an incidence of approximately 20 per cent in women over 30 years of age. They are decidedly more common among Negro women in the United States, affecting between 30 and 50 per cent over 50 years of age. Cullen[14] reported in 1898 that fibroids were found at autopsy in one-third of all Negro women over 20 years of age. A similar study of white women disclosed an incidence of 10 per cent.

Age—Uterine fibroids may develop at any age but are rare before the age of 25 years. Most of them occur at about 40 years of age, and the average age has been reported as 42. They have been described, however, in newborn children and prior to puberty. Cullen[14] stated that 2 per cent of patients are less than 25 years of age.

Etiology—The cause of fibroids is unknown, but clinical studies and laboratory experiments have offered several suggestions. There is a hereditary aspect, since the familial incidence is increased over the average. The condition is more common among Negroes than among white women. The hyperplasia of the uterus that occasionally is associated with uterine fibroids implicates endocrine disorders. The most convincing evidence involves persistent estrogenic activity, especially when unopposed by the activity of progesterone. Lipschutz and associates[15] and others were able to induce development of fibroids in the abdominal cavities of guinea pigs by prolonged administration of estrogens. These fibroids tended to regress when estrogenic therapy was withdrawn.

Histogenesis—The suggestion has been made that fibroids develop from connective tissue metaplasia or from undifferentiated cell rests in the uterine wall.

Pathology—Fibroids are longitudinal and transverse bands of uterine muscle bound together by varying amounts of connective tissue and arranged in a disorderly manner. Whorl formation is common in large tumors and is particularly characteristic of the fibrous types. Large fibroids are surrounded by a loosely woven layer of connective tissue clearly demarcating them from the uterine bed. The blood supply is limited to small vessels. Various descriptive forms of degenerating fibroids have been offered in the pathologic literature. The limitation of the blood supply to small vessels, which bleed little when the fibroids are removed, accounts for the nutritional disturbances that produce various forms of degeneration.

Growth—Most fibroids grow only during menstrual life and tend to remain stationary or to atrophy after the menopause. They usually grow slowly and steadily, the fibrous tumors growing slower than the predominantly leiomyomatous type. Pregnancy increases their size, mostly because of edema and congestion rather than because of actual hypertrophy of the nodule.

Number and size—Fibroids usually are multiple and their size varies widely. A single fibroid is present in less than 2 per cent of cases. As many as 120 fibroids have been de-

scribed in a single uterine mass. In most cases, however, there are less than 10 fibroids, and these vary from microscopic size to the largest reported, which was 195 lb.

Anatomic classification—Fibroids are classified anatomically as corporeal, cervical and intraligamentous. The clinical classification is somewhat differently oriented. Submucous fibroids extend under the endometrium and distort the endometrial cavity. They may protrude or prolapse through the cervix and appear as visible tumors on speculum examination. Interstitial or intramural fibroids are generally limited to the thickness of the uterine wall and cause somewhat less notable distortion of both the endometrial cavity and the serosal surface. Subserous fibroids may be sessile or attached to the uterine wall on its serosal surface by pedicles of various size. Finally, parasitic fibroids are those which probably originated as sessile or polypoid subserosal fibroids and became attached through inflammatory reaction to organs in the surrounding abdominal cavity. They may eventually lose their primary uterine attachment and adhere to other abdominal viscera.

Benign degeneration—This is due to alteration of blood supply, especially during the menstrual cycle, pregnancy, postpartum conditions and the menopause. Occasionally, torsion of the pedicle of a subserosal fibroid causes benign degeneration. There may be evidence of degeneration due to prolapse and necrosis with infection of a submucous fibroid. Atrophic changes are not uncommon, particularly in the postmenopausal period, and are the result of vascular insufficiency without infection. Hyaline degeneration has been described, as well as calcareous deposits in the degenerating fibroid. Edema and cystic degeneration are not unusual in moderately large fibroids and again are related to insufficient blood supply. Necrosis and infarction may occur at any time in the life cycle of a uterine fibroid, and hemolysis may account for the disturbance described as "red degeneration." Sometimes fatlike cells appear to infiltrate the degenerating fibroid, and this has been called "fatty infiltration."

Association with malignancy—In less than 5 per cent of cases, cancer is associated with uterine fibroids, either within the fibroid or in the uterus. Cullen[16] reported an incidence of 2.5 per cent, Essenmoeller[17] 3 per cent, and Lynch[18] 2.5 per cent as recently as 1930. Sarcomatous changes occur in between 0.5 and 2 per cent. Winter reported that in a careful study conducted to detect areas of malignant changes in fibroids, sarcomatous change was noted in 3.2 per cent. Cullen in 1909 reported finding 34 sarcomas in the uterine fibroids removed from 1400 women, an incidence of 2.6 per cent. Lynch[18] in 1930 reported an incidence of sarcoma in the fibroid uteri of 0.4 per cent.

Malignant change in a fibroid cannot be diagnosed grossly in its early stages. It occurs somewhat more frequently in submucous fibroids, but Cullen's cases were mostly intramural and subserous.

The relationship of adenocarcinoma and uterine fibroids is also of interest, since carcinoma of the uterine fundus is more common in women with uterine fibroids than in women without this benign disorder. It has been stated that carcinoma of the fundus is as common among women with uterine fibroids as cancer of the cervix is in general. Noble suggested an incidence of 1.54 per cent for fundal cancers in association with uterine fibroids.

Effect on other pelvic tissues—Uterine hypertrophy was mentioned earlier in association with the "work hypertrophy" of the uterus in the presence of fibroids. This hypertrophy may involve both muscle and fiber cells. Endometrial edema and hemorrhage are not uncommonly associated with fibroids, nor are gross stretching and distortion of the tube. Ovarian changes associated with uterine fibroids are those described earlier, occurring as part of the prolonged hyperestrinism that causes endometrial hyperplasia. Occasionally the fibroids degenerate and adhere to surrounding structures. By their very size and weight they may press on the bladder, rectum and ureter and disturb their function.

It is interesting that cardiac and cardiovascular complications are frequently associated with uterine fibroids. The mechanism of this association is not clear, but it has been sug-

gested that the main factors causing hyperestrinism may be related to the vascular disorders. Similarly, the suggestion has been made that toxic hyperthyroidism and neuropsychiatric disorders are increased in the presence of fibroids. Again, the common factors related to hyperestrinism may be active in this association. The incidence of goiters is somewhat increased among patients with uterine fibroids.

Symptoms—At least one-third of patients with uterine fibroids do not have any symptoms related to them. Those who do have symptoms may experience pain in the lower part of the abdomen and pelvis due to degeneration of the fibroid and associated inflammatory involvement of the peritoneum. Dysmenorrhea may be significant, particularly in the presence of submucous fibroids. The uterine contractions may be stimulated by the presence of a "foreign body" in the endometrial cavity, and the uterus attempts to expel it.

Sterility is not uncommon among women with uterine fibroids. The explanation for this may lie in mechanical interference with the normal fertilization process, but it is felt that the common hyperestrinism related to microcystic ovarian disease results in relatively infrequent ovulation. However, consideration of the successful effects of multiple myomectomy in the presence of infertility (*post hoc, ergo propter hoc*) weakens this position somewhat.

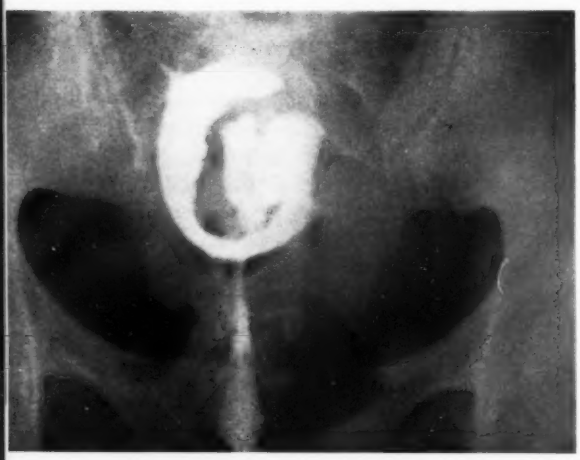

FIGURE 5. Hysterosalpingogram revealing a large endometrial submucous fibroid.

(Figures 2 through 5 courtesy of Dr. S. A. Robins.)

FIGURE 6. Gross appearance of a submucous fibroid such as seen in figure 5. The uterus has been opened along its lateral margin.

Uterine fibroids may cause disturbances in pregnancy, labor and puerperium due to interference with placental implantation. A decrease in growth potential of the uterus and distortion of the uterine contracting power by irregular fibroid masses may result in desultory labor. Postpartum retention of the placenta is not uncommon, and postpartum hemorrhage is somewhat more frequent. The fibroid may involve the low uterine segment or the cervix or both, and tumor praevia may interfere with normal parturition. Large fibroids may produce significant symptoms of pressure, and symptoms related to the bladder and bowel are also directly proportional to the size and position of fibroids. Menorrhagia associated with fibroids ordinarily is limited to the submucous fibroid, which interferes with the normal vascular changes of the endometrial layer.

Diagnosis—Uterine fibroids usually are identified manually on physical examination. Hysterosalpingography may reveal submucous fibroids of varying size (figures 5 and 6) in cases in which the uterine contour is symmetrical and the uterus is only moderately enlarged. At times the diagnosis is best made at celiotomy.

Differential diagnosis—It is not always possible to distinguish between ovarian cysts and

uterine fibroids preoperatively. Ovarian cysts generally are softer, more symmetrical and smoother and limited to one adnexal area. The differentiation of uterine fibroids and an asymmetrical uterine gestation may be difficult. A positive pregnancy test early in the gestation is helpful. X-ray evidence of pregnancy may be available at about 16 to 20 weeks, but fibroids may obscure early fetal skeletal evidences. Fetal heart tones in the enlarged uterus with fibroids are incontrovertible evidence of gestation as a complication of uterine fibroids. In any case, conservative management of the patient with fibroids and amenorrhea and other evidences of pregnancy will eventually lead to demonstration of the presence of either fibroids or pregnancy or both.

Differential diagnosis of uterine fibroids and chronic inversion of the uterus may be more difficult, but the much lower incidence of chronic uterine inversion makes this distinction less urgent. Inversion usually is manifested by a vaginal mass, and manual examination often fails to demonstrate the suprapubic mass associated with fibroids. The two conditions may be closely related, since a fundal fibroid may be instrumental in initiating an inversion.

It is important to distinguish between ovarian or rectal cancer and uterine fibroids, particularly since treatment and prognosis differ decidedly. Fibroids are rarely fixed, usually are somewhat symmetrical, and generally are mobile, whereas a large proportion of malignant disorders involving the ovary or rectum are fixed, somewhat irregular and firm.

One must always bear in mind the possibility of an aberrant kidney or spleen in the pelvis. Pyelography facilitates this differentiation when the kidney is involved.

Prognosis—The tendency for excessive bleeding in association with uterine fibroids is a disturbing sign and suggests the need for investigation. Fibroids that are large or growing rapidly are of serious import, since this may be the first clinical sign of sarcomatous change. Infarction or necrosis is an indication for treatment, and the morbidity and mortality rates under these circumstances are somewhat higher than when a simple fibroid is present.

In the absence of malignant degeneration the outlook for patients with uterine fibroids who receive proper treatment is excellent. Postoperative complications are significant in that both vascular thrombosis and vascular embolism reportedly are more common after operations for treatment of fibroids than after similar pelvic operations in the absence of fibroids.

Treatment—Regular follow-up observation at intervals of four to six months should suffice if uterine fibroids are asymptomatic, small in size, and unrelated to infertility. The majority of fibroids may never require therapy under these conditions. If the fibroid is moderately large and associated with sensations of weight and pressure, pain or disturbed uterine bleeding, multiple myomectomy is a procedure which has long been recommended for younger women. It is being more widely applied by gynecologic surgeons. Certainly in the presence of infertility it is highly desirable to remove the fibroids and preserve the uterus. Postmenopausally it is best to perform hysterectomy for fibroids, particularly if they are the size of a four month gestation or larger or associated with sensations of weight, pressure, and pain and signs of necrosis or bleeding.

The advisability of removing ovaries at the time hysterectomy is performed in younger women has been questioned. The problem does not have a final answer, but the present feeling is that retention of ovarian tissue in these instances militates against the development of vascular disorders. In women 45 years of age and older it would appear that retention of ovarian tissue offers somewhat less of an advantage in this respect, and tissues may be left that may become a source of serious disease later in life. Therefore, it is recommended that some ovarian tissue be spared (perhaps one normal-appearing ovary) at the time of hysterectomy in women under 45 years of age, and that ovarian tissue need not be spared in women over 45.

Several years ago radiation therapy was used as an alternative approach to management of uterine fibroids. At present it is much less widely used. The advent of proper surgical safeguards such as blood transfusions,

control of infection, postoperative electrolyte management, and more adequate anesthesia adapted to the patient's needs have greatly decreased the contraindications to surgical removal of the uterus, and these are few indeed at present. Since the only valid indication for supracervical hysterectomy is technical inability to perform panhysterectomy, the term "hysterectomy" as used here generally implies "total hysterectomy."

Lipoma, Osteoma and Chondroma, Hemangioma and Lymphoma

Various benign desmoid tumors may develop in the uterus independently. When associated with uterine sarcomas they are designated as teratoid tumors. The great variety and the many minor differences in growth and invasive capacity of the mixed tumors make classification difficult. The diagnosis is almost always made by the pathologist, since the majority of these tumors are called "fibroids" preoperatively. All are usually treated by hysterectomy.

Lipoma—Lipomas are single mixed tumors containing both fat and smooth muscle. Their size varies greatly, the largest thus far encountered being 17 cm. in diameter. Both the cervix and the fundus have been involved but the latter is a more frequent site. Grossly, lipomas appear quite greasy and yellow and are quite distinct from the more common degenerating myomas with fatty infiltration.

Most lipomas are benign, but a few cases have been reported in which sarcomatous changes were found.

Chondroma and osteoma—Mixed tumors of the uterus frequently contain cartilage or bone and adhere to their teratoid nature. Cartilage and bone formation occasionally is found in myomas, and here the neoplasia has been attributed to metaplasia of the stroma. In some instances the diagnosis can be made preoperatively on the basis of the distinctive x-ray appearance of the bone and cartilage

Angioma, lymphoma, pericytoma—These are predominantly benign tumors, although hemangiopericytomas have been considered mildly malignant in their characteristics.[19] They may develop as part of teratoid tumors rather than as isolated neoplasms.

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Wanted: The Practice of Preventive Medicine

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ONE great weakness in the present system of medical care is that it rests with the patient to make the first gross diagnosis of his illness"[1] or even to recognize that he is ill.

The term preventive medicine is a semanticist's despair. There is no clear-cut line of demarcation where preventive medicine begins and ends. It means different things to different people. To the bacteriologist it means the discovery of the causative organism, elimination of the possibility of infection, or the provision of effective immunity in the potential patient. To the clinician it means early diagnosis and prevention of more disabling disease. Further confusion arises from such terms as primary prevention, to avoid disease entirely as in prevention of typhoid fever or tuberculosis, and secondary prevention. The latter is not prevention at all in one sense, since it refers to the application of diagnostic procedures designed to identify disease early, possibly in the asymptomatic state, for the purpose of instituting medical procedures to arrest or slow down the disease process before it results in disability.

According to Baehr, Corwin and Miller,[2] the term " 'preventive medicine' is primarily concerned with the health problems of the individual." Preventive medicine deals "with such conditions as the immunization of the individual against certain communicable diseases, the state of his nutrition, the early treatment of incipient disease, and the application in each case of the available skills of medicine and surgery and of community organization for the prevention of the sequelae of serious illness."

Leavell[3] spoke of preventive medicine as "an approach to the patient, an awareness of his broad needs, and an anticipatory attitude on the physician's part." It is part of medical practice. We are unwise to force too great a

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distinction between preventive and curative medicine. Often they go hand in hand. Operation for a congenital defect in the heart, if successful, can be curative for the malformation and preventive in avoiding early death from inadequate circulation.

Our summons to the practice of preventive medicine is evident in the continuing existence of infections and chronic and mental diseases; in the findings from medical surveys of ostensibly healthy people; and in the character of demands on physicians, hospitals and other agencies concerned with health.

Infectious disease is still a world-wide health hazard. Meyer[4] said, "More than one-half of the deaths and probably an even higher proportion of the sicknesses of mankind are caused by the infectious diseases. . . . Current annual death tolls from malaria are 3,000,000 for the entire world." An appreciable morbidity and mortality are yet with us for forms of pneumonia and other respiratory infections, meningitis, septicemia, intestinal infections and numerous viruses pathogenic for man. Many communicable diseases are yet uncontrolled, even those wherein we have the basic knowledge which would appear to allow successful control.

The older age groups, among whom the chronic diseases have long been the major health problems, now constitute 10 per cent of our population, and their number increases yearly. Most of our geriatric patients are ill because of neglected nutrition, because of degenerative disease, or because they are emotionally ill, idle, unhappy or abandoned. We cannot expect treatment initiated after illness is well established to accomplish much in this group. Medical aid must come earlier, be directed toward maintenance of health, and grow largely from the personal physician-patient relationship in the practice of medicine.

The four most common and serious threats to life in the late years are: (1) blood vessel breakdown, (2) cancer, (3) arthritis and rheumatism, and (4) nervous and mental disorders. In all of these threats, it appears that two basic factors are significant: (1) nutrition, and (2) prolonged stress or exhaustion. Both the investigation and application of promising forms of prevention of disorders of aging patients require our attention.

TABLE 1

RESULTS OF PERIODIC EXAMINATION OF 10,000 WORKERS IN A CHEMICAL INDUSTRY

	PER CENT
20 lb. or more overweight	29.3
20 lb. or more underweight	9.0
Dental and gingival disease	15.6
Hypertension*	22.4
Visual errors†	30.7
Corrected, 24.3 per cent	
Uncorrected, 6.4 per cent	
Impaired hearing‡	11.9
Inguinal hernia	1.9

*Systolic pressure above 150 mm., diastolic pressure above 90 mm., or both.

†Vision less than 20/50 in one eye, or 20/40 or less in both eyes.

‡50 per cent or less of normal hearing in either one or both ears.

Approximately half of the nation's hospital beds are said to be occupied by patients with mental disease. One of every 20 adults is likely at some time during his lifetime to be a patient in a mental hospital; an additional one or two of that number at some time will be substantially disabled by mental disabilities which do not require care in an institution.[2,5]

The records of the Veterans Administration hospitals suggest that the incidence of severely handicapping emotional disturbance is high. Estimates are that 20 to 25 per cent of industrial workers are maladjusted. They are either dissatisfied with their work, unhappy at home, angry with the boss, disturbed by financial insecurity, or just plain unstable. There is reason to believe that the so-called minor emotional disturbances, unless corrected, are potent producers of subsequent human misery and inefficiency.[5]

The results of health surveys of workers show a need for more effective practice of preventive medicine. In a garment industry more than half the workers had errors in visual refraction, nearly a third had dental caries and gingival infection, and an appreciable number were obese or had malnutrition, psychoneurosis or anemia.[6] Table 1 shows the results of recent periodic examination of 10,000 workers

in a chemical industry. Much of the disease and disability found in this manner is clearly preventable or correctable, or is subject to improvement by acceptable medical or surgical management.

The shortage in our working force—all of it, from the supercharged Phi Beta Kappas to the laborer in the bull-gang—constitutes a demand for any step which keeps the workers on the effective list. Substantial absenteeism cannot be tolerated. Once upon a time, vacancies could be filled by shifting a few men or hiring extra workers to perform hand operations that practically anyone could do. Currently, most of the workers are specialists, trained to operate complicated equipment. The capital investment per employee has increased rapidly (automation); this investment now is so large in some industries that the illness of a single worker may be as costly as the absence of a movie star in the shooting of a big film.[7]

Trends in the character of service provided by community hospitals point to an increasing recognition of the role of prevention. Such developments are: diagnostic clinics; consultation services; periodic examinations for the ostensibly well person, including screening procedures; child welfare and child development clinics; prenatal and postnatal clinics; preventive dentistry and oral hygiene; follow-up clinics; nutritional advice and supervision; social service departments, and programs for convalescent care and home care. These developments have their *raison d'être* and their accomplishments in health maintenance.

An interesting citation on the nature of man is that increased leisure time for millions of Americans has enlarged the need for the practice of preventive medicine. A steady diminution in hours of work required in industry and in the home is a well-known by-product of our economy. Most persons are thereby released from breadwinning and homemaking tasks for many hours each week. It may be noted that a sizable group thus emancipated busy themselves killing each other on our highways. Others turn to health destruction through ill-advised sports and spectacular pastimes induced by alcohol.

Leisure time is used by more people in "do-it-yourself" projects. Here, one may be working in a field for which he is not trained, with tools and solvents which he uses clumsily and without recognition of hazards involved. The result has been an increase in home accidents. Calver[7] said that "our puritanical tradition, which holds that it is sinful to be idle, leads people into all kinds of extremes in using their free time."

Does a physician find more leisure time desirable for himself and his fellow men except under conditions whereby that time is well spent? The shorter work week is widely preferred; it is probably here to stay so long as it is economically feasible. Physicians cannot escape their responsibility to share in guiding the use of leisure time toward the end that it may be salubrious.

A renewed effort in preventive practice is demanded by the sheer impossibility of providing enough manpower (in terms of physicians and auxiliary personnel), enough money, and enough knowledge to cure everybody. The National Health Service of Great Britain has shown the impossibility of paying for all of the curative medicine required by a populace.[8] James B. Conant[9] observed, "To train enough professionals to keep all the people well by curing disease would involve expenditure of so large a fraction of income of any nation as to make the cure less attractive to the taxpayers than the disease. Indeed, if we tried to do the job without our present knowledge of preventive medicine and public health, the situation would be hopeless."

There must be wider clinical practice of preventive medicine because the job we face cannot be done alone by those specializing in public health, pediatrics, industrial medicine, or in other forms of practice concerned with preventive medicine in particular. Some such specialized forms of practice do not provide the personal contact with the patient which is needed if certain disease processes are to be avoided. Let us contrast the health hazards of typhoid fever and obesity. By applying public health methods in the United States, we have reduced the need to treat patients with typhoid fever to near the vanishing point, but there are no central areas of control where a third party

may eliminate obesity, comparable to maintaining a source of uncontaminated water, milk and food. Can one conceive of the successful control of obesity in a prosperous and a reasonably free way of life by any method other than restricting an individual's intake of food? This is a highly personal matter, yet it can be approached through the patient-physician relationship of private practice. We have the necessary knowledge, but we must find and furnish the motivation needed by the individual patient. The increased mortality rate of overweight people from diabetes, cancer, biliary tract disease, cirrhosis of the liver, toxemia of pregnancy, thrombo-embolic complications, and surgical procedures is well known. Obese patients have more accidents, more degenerative joint disease, more intertrigo, more varicose veins, more hernias and more cardiovascular disease. Even a greater number of suicides in the overweight group belies the common belief that the fat man is a jolly one!

The clinical practice of preventive medicine is, of necessity, the answer to obesity. The few corpulent persons who do achieve and maintain an optimal weight usually do so under guidance of a personal physician—not because the fountainheads of nutritional knowledge say obesity is a serious health hazard. We can prevent thiamine deficiencies by adding thiamine to the bread of our fellow citizen, but we cannot keep him from taking unneeded calories by any action on our part at the flour mill, low calorie "health breads" notwithstanding!

A final illustration of the demand for the clinical practice of preventive medicine will be noted. It is reported that there are eight or more medical-line television shows weekly, having a combined national audience of at least 50 million persons.[10] Health has attained the status of big news, rating with food, shelter, clothing and atomic energy in the space or time allotted in newspapers, journals for lay readers, and radio and television programs. The inexorable result is that the public wants something done about its health hazards, both real and imaginary.

How well are we doing, and what are the roadblocks in the practice of preventive medicine? Much of current practice of physicians is actually in the field of prevention. He who provides sound nutritional help for his patients, quietly educating, countering the claims of food faddists and purveyors of special nostrums offered for nutritional purposes, is practicing prevention of disease. The gastroenterologist is practicing prevention when he stops the habitual use of cathartics by the patient with a bellyache and thus allows that patient's colon to fill and empty, to function as a normal and pain-free structure. The cardiologist does the same when he instructs the rheumatic fever patient in the control of group A beta hemolytic streptococcal infections. The excision of precancerous lesions of the skin, premarital instruction, and judicious attention to anxiety states likewise are accepted phases of preventive medicine.

Dowling and Shakow[11] sought to learn how time was used by a group of internists on various phases of their daily practice and found this distribution: Fifty-five per cent of the time was spent in diagnosis and treatment, 26 per cent for preventive measures (18 per cent in health surveys, 1 per cent in immunization, and 7 per cent in counseling), and 19 per cent for health education (15 per cent related to treatment and 4 per cent to prevention).

Shannon,[12] of Australia, made a thought-provoking report, with a dash of self-analysis, under the title "Endemiology in family practice." He found, in reviewing his practice, many instances of long-standing but ignored emotional disorder as a common accompaniment to physical disease. He observed, "Although I seemed to have ample opportunity, I did little or nothing to prevent its (the emotional disorder's) onset." He described stress situations which could have been mitigated, but wherein the attempt was not made, and concluded, "I have now apparently put myself into the awkward position of having suggested that 'stress' is the commonest factor in producing 'ill-defined' symptoms and thereafter 'well-defined' disease; it is some comfort that I find myself in the company of Hans Selye and his general adaptation syndrome (which I do not understand), and of the Christian Scientists (with whom I cannot agree)."

Topping[13] has presented the problem of the practitioner in this way: "There are certain admitted basic factors in the causation of ill health—faults in nutrition, environment, conditions of work, general habits and mode of living. . . . Few of them (the public) appreciate that 90 per cent of the illnesses from which they suffer and for which they consult their doctor are avoidable, either by their own efforts or by community action. They have been brought up with a blind faith in the dog-latin diagnosis of their illness and a bottle of medicine. Under present circumstances, it is difficult for the general practitioner to do anything but to perpetuate this mental attitude. . . . The great majority of doctors would welcome an opportunity to take an active part in disease prevention, but they are so snowed under with routine treatment of trivialities that the urge quickly dies and consciences become hardened."

Giving lip service to the ideal and far-reaching concept of preventive medicine is quite like professing a preference for the good and the beautiful and opposing sin. Physicians accept prevention of illness and injury as a worthy desideratum. Why the lag and frustration in prevention? Let us examine some practical reasons why we do not spend more of our professional lives in the millennium of prophylaxis. We must be ever aware of this if we are to cope with our responsibilities.

Man continually changes his environment and so modifies the nature of his afflictions. These changes outstrip the rate with which medical science controls man's major scourges. Pneumonia deaths are reduced and the deaths from lung cancer increase. Deaths in childhood are prevented and we have a larger population developing the degenerative diseases of later life. The changing demands on the skill of the physician are centuries old.

There is a lag in applying "know-how" in human affairs. There are many experiences to show that one, two or more generations may elapse before significant health knowledge gleaned from a laboratory or reported from clinical experience is widely and effectively applied. Chlorination of drinking water had to be sold—now fluoridation! Garland[14] has called the phenomenon "unassimilated progress." Aside from a continuing need for more knowledge, many of the difficulties of any generation arise from its failure to apply the knowledge which it actually possesses; thus. unassimilated progress in avoiding disease.

There is a dearth of knowledge of some health influences; half-truths have been passed along from generation to generation without critical study. The influence of housing, air pollution, working conditions, climate, temperature, light, color and noise are said to be important to health. How exact is our knowledge of the operation of these factors? Having accepted a place for mental hygiene in health preservation, how effective are our technics of utilizing mental hygiene? How much sleep does one really need, and how serious are the effects of lack of sleep? How vital is the exercise of skeletal muscles in the promotion of well-being? Systematic research in the subject of personal hygiene (a veritable den of half-truths!) is urgently needed. How does one define and select that way of life which is best for him?

As a further consideration, under the never-ending economic struggle these situations are apparent:

"Most well persons are disinclined to bother their physician until they get sick."[15] It is the repeated experience of private practice that people are less disposed to pay for preventive services than they are for treatment of manifest illness. Here is good reason to question the concept that man is a rational being, sufficiently motivated by self-interest, and adequately endowed with knowledge and foresight. He is not a thoroughly rational animal. He disregards knowledge which he finds unpalatable and repeatedly acts on an emotional basis, one which often contravenes the facts available to him. He may be quite ready to subject his child and his wife to the inconvenience or discomfort of valid procedures in preventive medicine, but he avoids them for himself!

Man's aversion to spending money for health has been attributed to such widely held beliefs as the following:[16]

1. The human body and mind require little maintenance and they can withstand

large amounts of self-imposed punishment.

2. The consumption of a few relatively cheap over-the-counter drugs will overcome whatever tendencies to disability may show up.

3. Since medical expenses are incurred to offset ailments that no one wants in the first place, it is better for the patient to wait until he is ill enough to get his money's worth from a visit to the doctor.

4. Making and keeping an appointment with a physician is a nuisance.

5. The result of a visit to the doctor is usually unpleasant in terms of both cost and time.

6. Spending money on things other than medical care is preferred because it brings more immediate gratification.

By way of contrast, there are occasional patients who appear to be quite willing to work with the physician in a preventive program yet who find themselves in circumstances which block that full cooperation. The judge with a duodenal ulcer may demonstrate to his physician and to himself that his ulcer is inactive so long as he remains off the bench. Both have identified the circumstances which mean recurring discomfort and progression of illness. So what? The patient's professional training and his responsibility to his family, to society, to his own peace of mind, dictate his continuing his career if at all possible. To remove such a patient from the practice of his profession is a form of failure for the therapist. The physician in many instances must compromise with factors beyond his control and fall short of an ideal program of ulcer management. Illustrations of circumstances which thwart the full cooperation of the patient with the program preferred by the physician are daily experiences.

An insensitiveness to the health appeal, to a better application of medical science, possibly has resulted from inadequacies in the basic education of our people. Winslow observed long ago that "one of our great needs is a better foundation of biological knowledge in elementary and secondary and higher education. Where basic biological concepts are absent, the task of health education is difficult. Where such a foundation has been laid, health teaching—approached from the positive and constructive standpoint of adult education in human biology—can be successfully attempted. Such a positive approach, based on health, seems on pedagogic grounds much sounder than a program which runs backward from disease to its prevention."

Finally, there may be an error in formal medical education which handicaps the physician in making his potential contribution toward educating his patients in maintaining good health and toward making health a national habit. The teaching of medical undergraduates and the programs of various medical societies are dominated by the treatment of disease rather than the promotion of health.

Vines[17] has described "the academic blunder of the divorce of Preventive from Clinical Medicine, its forced marriage to Public Health, and the subsequent relegation of the unhappy pair to the isolation of a faintly depressed specialism. This mistake now has much to answer for; through it, generations of doctors have been trained in the belief that preventive medicine is inseparably linked with sewage farms, with special hospitals for infectious fevers, and with the supervision of the purity of water supplies and foodstuffs." Vines continued, "In recent years a welcome effort has been made to bring the preventive ideal back into clinical medicine under the new name of 'social medicine'; but there are signs that once again this too is becoming ranked as a specialism, to the student another pigeonhole in the curriculum, and in general it still remains too remote from the daily round of ordinary teaching and practice."

Preventive medicine should not be isolated from the main current of medicine for training purposes. The student learns in practice that many phases of a physician's responsibility go hand in hand. Since the pediatrician has learned to stress the normal development of children and the avoidance of disease as his best contribution, there seems to be hope that practitioners of other specialties can broaden their interests and delight in the recognition and encouragement of health along with the cure of disease in their patients.

In the words of Rudyard Kipling ("The Jester," verse 2):

There are three degrees of bliss
In the Gardens of Paradise,
And the second place is his
Who saves his brother's soul
By excellent advice.
For there the Glory lies!

This degree of bliss is open to physicians.

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Postgraduate Clinical NOTES

101. THE HOPELESS CASE

"Hopeless" patients are those of any age group who are suffering from a disease or state which we, with our present knowledge, regard as incurable. At any moment, with increasing knowledge, one or more will be struck off the list. In other words, the incurability or hopelessness is used by us as an expedient pending further research, and there is no reason therefore why we should not adopt a positive approach to those patients from the very beginning, and follow the excellent example of the Bishop of Durham (Harland, 1957) who said of the dying that they must never be deprived of their last joy on earth—which is hope.

Hope is a state of mind in which one expects confidently that what one desires will come about—it is confident anticipation. Until a certain stage is reached in the lives of these patients for whom we have so far failed to find a cure, they are confident of their return to a state of health comparable to that of the average individual they see around them. They are, in fact, hopeful. When they begin to die their desires change, so that they look forward with confidence to their dying and to this world's release from their adversities. They are still hopeful.

Ronald Gibson, The management of the hopeless case, *Proceedings of the Royal Society of Medicine*, February 1958, p. 111

Replacement of Major Vessels Affected by Segmental Arteriosclerosis Obliterans or Aneurysms

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IT has been well established that about 60 per cent of people more than 40 years of age will die of some manifestation of arteriosclerosis—cerebral, renal, coronary or peripheral—and that arteriosclerosis continues to gain ground as this country's number one killer. Little progress has been made in discovering the cause or cure of arteriosclerosis, but in recent years dramatic progress has been made in the treatment of one type of the disease, namely, arteriosclerosis obliterans. Although the treatment does not cure the disease, the manifestations in selected cases can be completely relieved. Heretofore, the great amount of information about arteriosclerosis obliterans has been theoretical, but many features of the disease which previously were conjectural now can be demonstrated by angiography. In this report, we shall present a series of angiograms which may serve to make this disease more clearly understood.

Pathology

Arteriosclerosis obliterans is an occlusive arterial disease due to atherosclerosis, a condition of unknown origin in which the lumen of the artery becomes smaller because of the piling up of atheromatous plaques in the intima, which becomes greatly thickened. Thrombosis may occur on these plaques and cause complete occlusion (figure 1). Occasionally, subintimal hemorrhage also will occlude the lumen and result in a complete block. Microscopically, the degenerative nature of arteriosclerosis obliterans is characterized by a greatly thickened intima and occlusion of the lumen by a clot that becomes organized and often

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FIGURE 1. Gross specimen of aortic bifurcation showing thickened intima, an adherent organized thrombus in the aorta, and a calcified plaque in the right common iliac artery.

FIGURE 2. Bilateral femoral arteriogram showing segmental occlusion of the right superficial femoral artery and a rich collateral circulation. Note the patent artery and the absence of collateral arteries on the left side.

becomes calcified. The media, the adventitia, the periarterial tissue, the veins and the nerves are free of the disease.

The disease develops slowly and insidiously, and meanwhile collateral vessels form. The collateral vessels usually are adequate to maintain the viability of the affected part. However, in most cases, the collateral circulation is not sufficient to prevent symptoms, especially during exercise, and the typical symptom of intermittent claudication will appear. As the disease progresses, collateral vessels may become occluded, pain may occur while the patient is resting, and ulceration and gangrene may develop.

Figure 2 is an example of early complete occlusion of the right superficial femoral artery. An excellent collateral circulation has formed through the terminal branches of the deep femoral artery and has bridged the gap much as a detour in a road would do. Small muscular branches have developed from the point of occlusion and have brought the blood back into the main vessel. The main vessel was

FIGURE 3. Aortogram showing segmental occlusion of the left external iliac artery at the level of the lumbosacral joint. Note the rich collateral circulation in the area of the left hip and the refilling of the femoral system in the left groin.

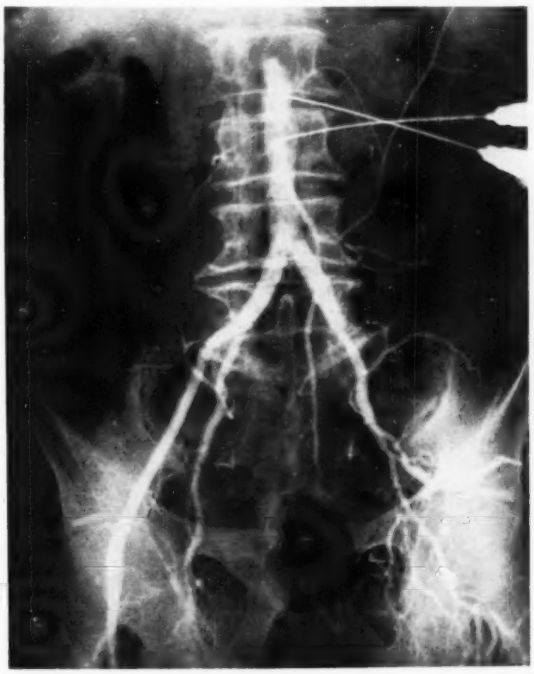

FIGURE 4. Aortogram showing occlusion of the right common iliac artery and the complete absence of collateral circulation.

open distal to the point of occlusion. As the need arises, collateral circulation develops by dilatation and hypertrophy of pre-existing arterial channels. This is clearly illustrated by the absence of such channels when there is a patent superficial femoral artery (figure 2).

Figure 3 shows an occlusion of the left external iliac artery at the level of the lumbosacral joint. An excellent collateral circulation has formed through the superior gluteal artery, the deep iliac circumflex artery and into the lateral femoral circumflex artery, and through the terminal branches of the internal iliac artery, the obturator artery, and into the medial femoral circumflex artery.

When a thrombus suddenly occludes an artery, the condition is similar to that which occurs when an embolus suddenly occludes an artery. Collateral vessels do not have time to develop (figure 4), marked ischemia and gangrene frequently occur, and amputation often is necessary. Acute occlusion is not the rule in cases of arteriosclerosis obliterans, which usually develops slowly and insidiously.

As a result of a study of more than 800 angiograms, we have been able to recognize two distinct types of arteriosclerosis obliterans. The first type (figure 5) occurs in elderly patients, predominantly men, whose average age is 65 years. The patients have severe and diffuse arterial disease, and 20 per cent of them are diabetic. Figure 5a shows diffuse and severe disease of the femoropopliteal system without occlusion. Figure 5b shows occlusion of the superficial femoral artery at its origin in the groin, which is not visible. The collateral vessels to the lower extremity are derived from the terminal branches of the deep femoral artery. This type of occlusion, of course, is a serious condition. If sympathectomy is not helpful, amputation may be necessary. Figure 5c shows diffuse disease of the aorta and iliac arteries without occlusion.

The second type of arteriosclerosis obliterans occurs in patients whose average age is about 50 years. The pathologic changes, however, are the same as those in the first type of the disease with the exception that the occlusion tends to be localized and the arteries elsewhere in the body are relatively free of the disease. Patients with this type of the disease respond favorably to resection of the involved segment and its replacement with a graft.

Figure 6a shows a short segmental occlusion of the superficial femoral artery in a case of this type of the disease. A good collateral circulation has been formed by the muscular arteries at the origin of the occlusion. The deep femoral artery, the remainder of the superficial femoral artery, the popliteal artery and the arteries of the leg are normal. Figure 6b shows a segmental occlusion of the left common iliac artery. The other vessels appear to be free of the disease. This patient also is a good candidate for resection of the involved segment and its replacement with a graft.

Symptoms and Signs

The first pathognomonic symptom of arteriosclerosis obliterans almost always is intermittent claudication except in cases of acute

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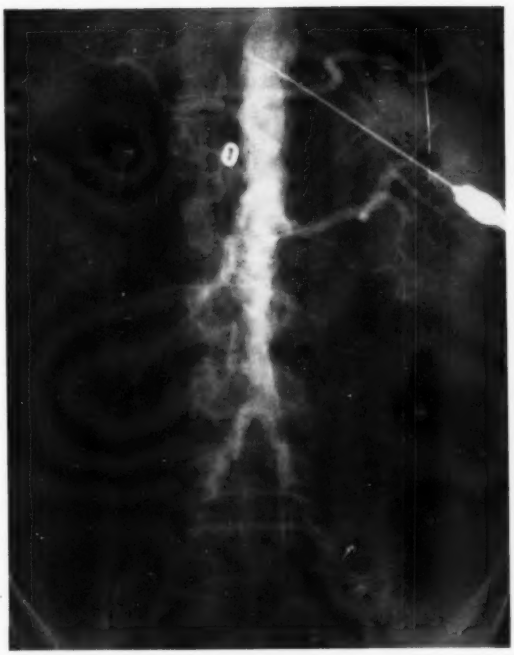
FIGURE 5a. Femoral arteriograms of the upper and middle part of the thigh *(left)* and the lower part of the thigh and leg *(right)*. Diffuse disease without occlusion is present throughout the femoropopliteal system. b. Femoral arteriograms showing occlusion of the superficial femoral artery at its origin in the groin, without refilling. All circulation to the leg is through collateral vessels formed from the terminal branches of the deep femoral artery. c. Aortogram showing diffuse disease of the entire aorta and iliac arteries without occlusion.

c



occlusion. The patient will state that he can walk only a certain distance before the onset of pain, fatigue or a cramp causes him to stop. When he stops, the distress disappears in a minute or two, and he then can walk the same distance again. Most people think that intermittent claudication means pain limited to the calf. It is true that it occurs more frequently in the calf, but it can and frequently does occur at other levels, depending on the site of the occlusion. When the aorta or iliac arteries are involved, the claudication is in the hip; when the external iliac and common femoral arteries are involved, it usually is in the thigh; when the superficial femoral artery is involved, it is in the calf; and when the arteries of the

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FIGURE 6a. Arteriogram showing short segmental occlusion of the superficial femoral artery in Hunter's canal. Note the absence of disease elsewhere, and the patency of the arteries below the knee. b. Aortogram showing segmental occlusion of the left common iliac artery and excellent refilling of the external iliac artery.

leg, such as the anterior and posterior tibial or peroneal, are involved, the claudication frequently is in the foot. Thus, the level of the claudication is a reliable indication of the location of the block in the artery.

As the disease progresses, coldness and numbness may occur in the foot, and pain eventually may occur when the patient is at rest. This pain becomes worse at night. It is a relentless, gnawing pain, which sometimes is relieved when the patient sits up and hangs his foot over the side of the bed. It often causes the patient to spend his nights sleeping in a chair. The disease may progress, and ulceration and gangrene may occur.

If intermittent claudication is the only symptom at the time of physical examination, the nutritional status usually is good. There may be slight changes in color, such as slight pallor when the leg is elevated and slight rubor when it is depressed. There also may be a slight delay in the venous filling time. The venous filling time is abnormal if it is longer than 15 seconds after the leg has been elevated and then depressed. However, as the disease progresses and pain occurs when the patient is at rest, marked pallor occurs on elevation of the leg, marked rubor occurs when the leg is depressed, there is a marked delay in the venous filling time, the foot is cold, and there often will be trophic changes such as poor growth of the nails, a dry scaly skin, athlete's foot, ulceration and gangrene.

Diagnosis

It is relatively simple to make a diagnosis of arteriosclerosis obliterans on the basis of the history, the presence of intermittent claudication, the absence of pulsation, the occurrence of pallor when the leg is elevated, and the occurrence of rubor when the leg is depressed. However, there are certain important features that cannot be learned by physical examination, and these demonstrate the extremely valuable contribution of angiography. On an angiogram one can see the exact location of the occlusion, the length of the occlusion, the condition of the vessels above and

below the occlusion, and the location of other occlusions. One can tell whether or not the distal vessels are open, and this is of the utmost importance if grafting is to be considered, because the distal vessels must be open if a graft is to be successful. Moreover, one can learn about the status of the collateral circulation, which is important in the prognosis of the disease. Finally, the angiogram will indicate the best level for amputation when this is necessary. It particularly will indicate whether amputation can be performed below the knee, which is important for the patient.

Angiography must be adequately detailed. In cases of high occlusion, that is, occlusion above the inguinal ligament, in the aorta or in the iliac vessels, one should make an aortogram, and a retrograde femoral arteriogram should be made if the distal extent of the block cannot be seen on the aortogram. A routine "prograde" femoral arteriogram also should be made to determine whether the runoff is good in the extremities. Only bilateral femoral arteriography is necessary in cases of occlusion of the femoral artery.

Figure 7 demonstrates the importance of an adequate angiographic study. Figure 7a is an

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b

FIGURE 7a. Aortogram showing occlusion of the left common iliac artery. The distal extent of the occlusion is not shown. b. Retrograde femoral arteriogram showing that the distal extent of the occlusion is at the level of the sacro-iliac joint. c. "Prograde" femoral arteriograms showing that the arteries of the left thigh and leg are normal and patent.

c

FIGURE 8. Right femoral arteriograms showing a slight irregularity of the artery, the earliest stage of arteriosclerosis that can be detected by arteriography.

FIGURE 9. Arteriograms showing a very short segmental block of the left superficial femoral artery with excellent collateral flow.

FIGURE 10. Arteriogram showing a short segmental occlusion of the left superficial femoral artery. Note the collateral artery arising from the proximal end of occlusion.

aortogram showing occlusion of the left common iliac artery. The lower portion of the occlusion is not apparent, but the bifurcation of the aorta can be seen at the level of the fourth lumbar interspace. Therefore, a retrograde femoral arteriogram is necessary. In making this arteriogram, the femoral artery is compressed distal to the needle, and the contrast medium is injected into it in a retrograde direction. The retrograde femoral arteriogram shows that the block is situated at the level of the sacro-iliac joint (figure 7b). Since the bifurcation of the aorta is situated at the fourth lumbar interspace, the block is short and the patient is a good candidate for resection of the occluded segment and its replacement with a graft. Since the runoff below the occlusion must be good if a graft is to succeed, a "prograde" femoral arteriogram was made. This showed that the vessels in the left thigh and leg were free of disease and patent (figure 7c).

On the basis of the history and physical findings, one frequently can predict rather closely what will be seen on angiograms. In

FIGURE 11. Arteriograms showing a long segmental occlusion of the superficial femoral artery extending from its origin in the inguinal region to the lower part of the thigh.

FIGURE 12. Arteriograms showing severe diffuse disease and total occlusion of the superficial femoral artery except for a short segment in the midthigh. Stenosis is evident at the origin of the deep femoral artery.

cases in which the only symptom is intermittent claudication, one would expect the angiogram to disclose mild diffuse disease or a segmental block. In from 50 to 60 per cent of such cases, the segmental block will be amenable to resection and grafting. In cases in which the patients have more severe symptoms, such as ulcers or pain which occurs when they are resting, one can expect the angiogram to disclose severe disease, segmental occlusion and diffuse disease, or multiple segmental blocks.

Natural History and Angiographic Patterns of Arteriosclerosis Obliterans

From our study of many hundreds of arteriosclerotic patients we believe that we now are able to trace the natural history of the disease by angiographic methods. This is another example of the value of angiography. Three typical patterns have been evolved from our study: (1) that showing only intimal disease, (2) that showing a segmental block with refilling of the parent vessel, and (3) that showing a nonsegmental block without refilling. The angiographic pathologic patterns that we believe illustrate the natural history of this disease will next be described.

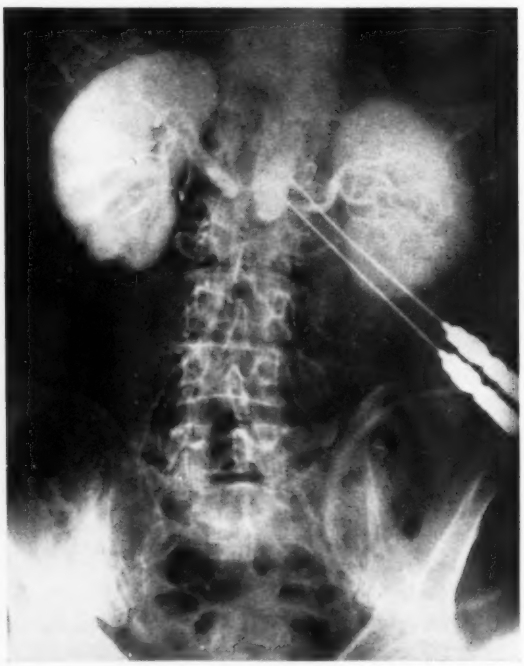
At first glance, figure 8 looks like a normal femoral arteriogram, but there are slight irregularities in the outline of the superficial femoral artery as it passes through Hunter's canal. These irregular areas are plaques in the artery, and we consider them to be an early stage in the development of arteriosclerosis obliterans. As the disease progresses, the lumen becomes stenosed and finally becomes completely occluded. Occlusions tend to occur in Hunter's canal, possibly for mechanical reasons. Blocks in the superficial femoral artery almost always start there. Bifurcations also are sites in which blocks frequently occur.

Figure 9 demonstrates the next stage of the disease. A thrombus has formed on a plaque and has caused a small segmental block. The patient is an excellent candidate for resection of the occluded segment and grafting. Figure 10 shows a longer segmental occlusion, again

FIGURE 13. Arteriograms showing diffuse disease of the superficial femoral, deep femoral and popliteal arteries, without occlusion.

FIGURE 14. Aortogram showing early short occlusion of the left common iliac artery.

FIGURE 15. Aortogram showing occlusion of the aorta at the level of the renal arteries and involvement of the right renal artery.



in Hunter's canal. The arteries are free of disease above and below the occlusion. This condition also is ideal for grafting.

Figure 11 shows a long occlusion of the superficial femoral artery. It starts at the origin of the superficial femoral artery, which cannot be seen until refilling occurs in the lower third of the thigh. The means of refilling is through the terminal branches of the deep femoral artery. There is good outflow below the occlusion, and a graft from the origin of the block to the point of refilling will establish circulation again.

Figure 12 is an arteriogram of a patient with more severe disease. The superficial femoral artery is blocked at its origin. Good refilling of the main artery is not evident, and there is no flow below the knee. Since there is no outflow, the distal segment of the artery is not suitable for the attachment of a graft. Severe stenosis is present at the origin of the deep femoral artery. The patient is not a candidate for a grafting operation, but probably is a candidate for either sympathectomy or an amputation.

Figure 13 shows diffuse disease of the su-

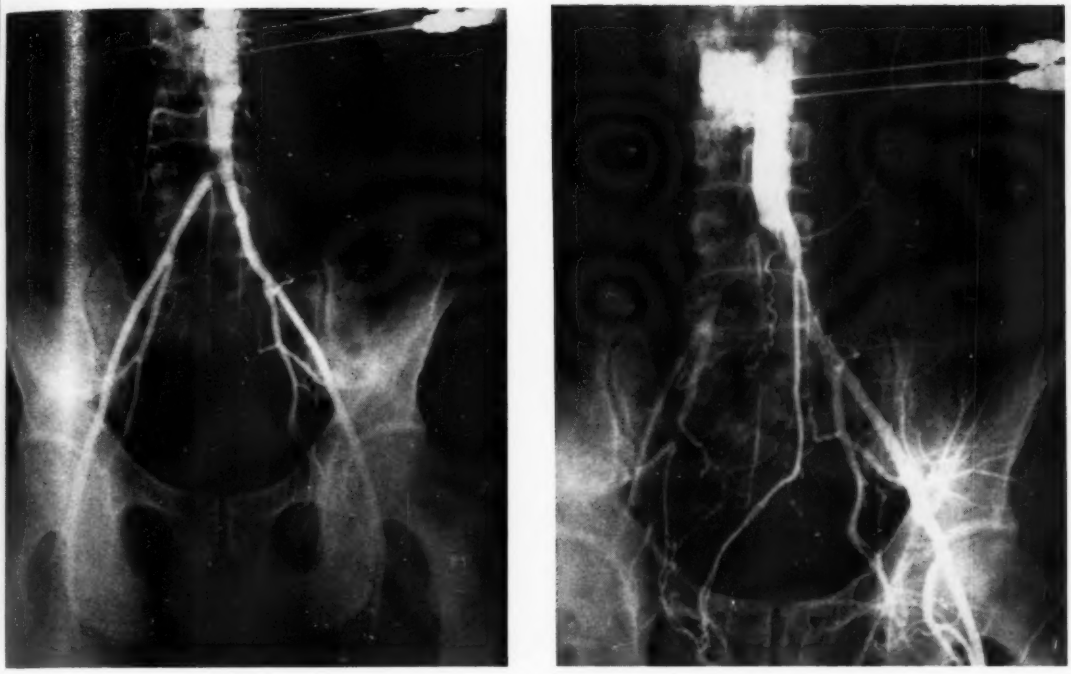


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FIGURE 16a. Aortogram showing a small block of the terminal portion of the aorta and the right common iliac artery. b. Aortogram showing that the block has extended to the external and internal iliac arteries.

perficial femoral artery without a block. If a block should occur, the patient would not be a suitable candidate for a grafting operation. In cases of this type, we often attempt grafting as a desperation procedure, but, as a general rule, the rate of success is much lower than it is in cases in which the patients are relatively free of extensive disease.

The development of the disease in the abdomen can be traced in a similar manner by aortography. Figure 14 shows an early segmental block at the bifurcation of the aorta. The patient is an excellent candidate for resection of the involved segment and replacement with a graft. Figure 15 illustrates occlusion of the aorta at the level of the renal arteries. The right renal artery also is involved. The patient is a good candidate for a grafting operation, but the right renal artery might have to be replaced. This procedure might be lifesaving in this case. We believe that almost all occlusions of the arteries of the abdomen and pelvis are amenable to grafting, since this operative procedure is successful in a large percentage of cases.

Diffuse disease of the aorta and of the common and external iliac arteries also may occur without occlusion. The symptoms are mild, and operation is not performed unless serious trouble develops.

The following question frequently is asked: What happens if a grafting operation is not performed in cases of arteriosclerosis obliterans? In some cases, no difficulty will occur. However, the disease usually tends to progress in one of the following ways: (1) There may not be any change in the symptoms, that is, the block may become longer but may not interfere with the collateral vessels; (2) small collateral vessels may become occluded as the disease progresses; (3) there may be a slow increase in the severity of the symptoms, particularly in elderly patients who have diabetes.

Figure 16a shows a small block involving the terminal portion of the aorta and the right common iliac artery. The patient refused surgical treatment and went home. When he returned to the hospital two months later, the block had extended into the external and internal iliac arteries (figure 16b). There was

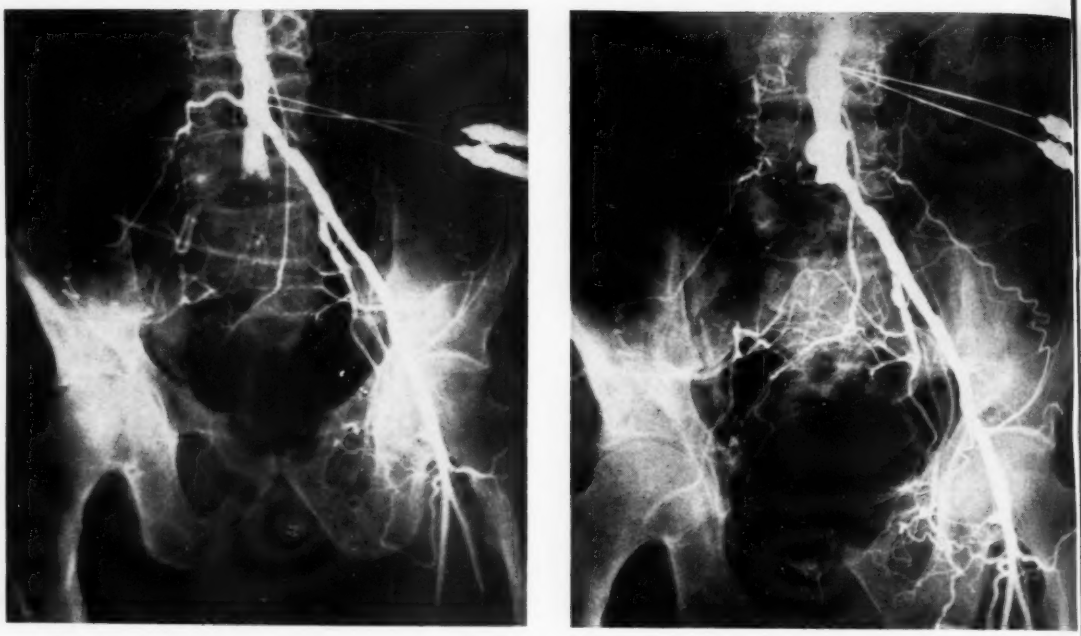

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FIGURE 17a. Aortogram showing a small block of the terminal portion of the aorta and the right common iliac artery. The large fourth lumbar artery provides most of the collateral circulation. b. Aortogram showing that the block has extended to obliterate the large fourth lumbar artery.

FIGURE 18a. Aortogram showing segmental occlusion of the terminal portion of the aorta and the left common iliac artery. b. Aortogram showing that the occlusion has extended proximally in the aorta and has involved the renal arteries.

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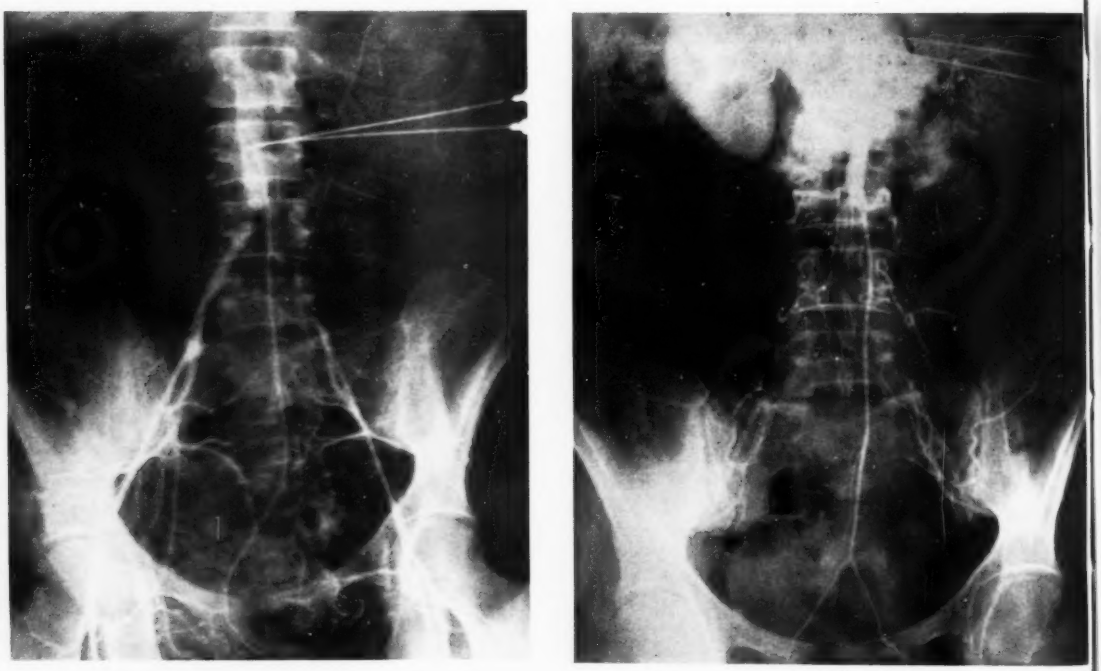

no increase in the severity of the symptoms because occlusion had not occurred in any of the important collateral vessels. A grafting operation produced an excellent result.

Figure 17a and b demonstrates slow progression of the disease, which was associated with a slow increase in the severity of the symptoms. In figure 17a, the right common iliac artery is occluded, and the large fourth lumbar artery provides most of the collateral circulation. Figure 17b shows subsequent occlusion of the fourth lumbar artery, which was associated with a mild increase in the severity of the symptoms.

Figure 18a and b is an example of rapid progression of the disease. Figure 18a shows segmental occlusion of the terminal portion of the aorta and the left common iliac artery. The patient was an elderly woman who had diabetes, coronary disease and mild congestive heart-failure. She, therefore, was not a candidate for a grafting operation. Within one month, the occlusion extended proximally in the aorta and also involved the renal arteries (figure 18b). The patient died of massive gangrene of the lower extremities.

Treatment

We believe that arterial grafting should be done when possible in cases of arteriosclerosis obliterans. When it cannot be done because of a contraindication or because of a patient's refusal, the patient is given a simple program of conservative care. We have found this to be as effective as all of the elaborate apparatus and drugs advocated over the years.

If intermittent claudication is the only symptom, the patient is told to stop smoking, and he is instructed in the care of the feet, that is, how to avoid infection, calluses, corns, athlete's foot, etc. He is told to elevate the foot of the bed on blocks to a height of 4 to 6 in., because the optimal amount of blood flow to the lower extremities is obtained with the bed in this position. He is encouraged to walk as much as he desires, because walking helps the development of the collateral circulation, but he is advised to walk slowly and to stop at the first sign of distress.

We do not use vasodilator drugs, because

FIGURE 19. Aortogram showing a homograft which had been inserted at the bifurcation of the aorta six months previously.

we have found them useless in cases of this disease. They frequently will dilate the normal vessels, but will not dilate the abnormal vessels. This could be harmful if blood is shunted from the diseased vessels to normal vessels. Most workers in the field of peripheral vascular diseases regard attempts at generalized vasodilatation as futile. However, if severe disease develops and is accompanied by pain which occurs when the patient is at rest, local vasodilatation is useful, and a series of lumbar sympathetic blocks and sympathectomy often are worthwhile. Local vasodilatation by means of the intra-arterial administration of PRISCOLINE® hydrochloride or histamine often is helpful.

When small ulcers develop, we use all of the measures mentioned previously in addition to bed rest, use of bland foot soaks, parenteral administration of antibiotics, and local application of antibiotic ointments. When large ulcers or gangrene occurs, amputation must be performed. Sympathectomy is useful if smoking has been discontinued entirely, if conservative measures have proved ineffec-

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FIGURE 20a. Plain roentgenogram of the abdomen showing a huge aneurysm of the aorta with a typical rim of calcium in the wall. b. Retrograde aortogram showing the immense size of the aneurysm. c. Appearance of the aneurysm at the time of operation. d. The aneurysm has been resected and replaced with a segment of thoracic aorta. The paired intercostal arteries have been ligated.

tive, if the disease is progressing, and if lumbar sympathetic blocks have produced an adequate response.

Arterial grafting is essential in cases of aneurysm of the aorta or arteries of the lower extremity, and it should be performed whenever possible. This statement applies particularly to cases of aneurysm of the abdominal aorta, because 90 per cent of the patients will die if the aneurysm is not removed. Grafting also is useful for arterial insufficiency resulting from old emboli and for the correction of arteriovenous fistulas.

Figure 19 is an aortogram showing a homograft which was inserted at the bifurcation of the aorta six months previously. The graft is open and functioning, and the operation produced complete relief of symptoms. Figure 20a is a plain roentgenogram of the abdomen showing a huge aneurysm of the abdominal aorta with a typical rim of calcium in the wall. Figure 20b is a retrograde aortogram showing the immense size of the aneurysm. Figure 20c shows the appearance of the aneurysm at the time of operation. The aneurysm was removed and replaced with a freeze-dried homograft of the thoracic aorta because of the large size of the patient's aorta (figure 20d). The condition of the patient is good four years after the operation.

Results

Between March 1, 1954 and June 1, 1958, we had performed an arterial grafting operation in 525 cases of arteriosclerosis obliterans or aneurysm. Freeze-dried homografts, sterilized with ethylene oxide, were used in all of the cases because a superior prosthesis has not yet been developed, because this type of graft has proved satisfactory in a high percentage of our cases, and because we have attempted to keep our series "pure" so far as the grafting material was concerned.

TABLE 1

CAUSES OF DEATH

CAUSES	CASES
Technical failure	4
Homograft failure	10*
Preoperative rupture of aneurysm	14
Other causes	28
TOTAL	56

*Infection of the graft occurred in six of these cases.

TABLE 2

LATE FAILURE OF ARTERIAL HOMOGRAFTS AFTER ELECTIVE OPERATIONS

YEAR	CASES*	AORTO-ILIAC GRAFTS	FEMOROPOPLITEAL GRAFTS
1954	25	2	4
1955	56	3	7
1956	106	4	21
1957	119	1	8
1958†	55	0	0

*The figures in this column represent the number of elective grafting operations that were performed in the respective years.

†Prior to June 1, 1958.

The operation was elective in 361 cases and nonelective in 164 cases. In the cases in which the operation was elective, the symptoms were not urgent, and the patients could be treated surgically at the convenience of all parties concerned. The patients usually had intermittent claudication, or had an aneurysm that was not leaking or painful. In cases in which the operation was nonelective, the patients had ulcers or gangrene that otherwise would have made amputation inevitable, or they had a leaking or painful aneurysm and death seemed to be imminent.

Death occurred in 56 of the entire group of 525 cases. The causes of death are listed in table 1.

In analyzing the results, the graft was considered successful if pulsation in the distal portion of the involved artery was restored postoperatively. If pulsation in the distal portion of the involved artery was not palpable postoperatively, the graft was considered a failure. Furthermore, the results were classified as an initial failure and as a late failure. In cases in which the result was classified as an initial failure, the graft never was patent; in cases in which the result was classified as a late failure, the graft was patent when the patient left the hospital, but it subsequently failed.

The result was classified as an initial failure in 31 cases, and as a late failure in 70 cases. In 31 of the 70 cases in which the result was classified as a late failure, the patients were relieved of their symptoms but had no pulsation in the distal portion of the involved artery. In four of the cases, the patients had symptoms but refused further surgical treatment. In five cases, the grafts were removed because of infection. A regrafting operation was performed in 30 of the 70 cases. In 26 of the 30 cases, the result of the second operation was successful and the patients have remained free of symptoms. The result of the second operation was classified as an initial failure in two cases and as a late failure in two cases.

The final result was successful in 78 per cent of the cases in which the operation was elective. Table 2 shows the number of late failures that occurred in this group of cases. It will be noted that the percentage of late failures has decreased remarkably during the last year and a half. This decrease is due to technical advances. The result was successful in 86 per cent of the cases in which an elective operation was performed for aorto-iliac occlusion and in 82 per cent of the cases in which it was performed for aortic aneurysm. The result also was successful in 68 per cent of the cases in which an elective operation was performed for femoropopliteal occlusion, but a regrafting operation was successfully performed in many of the failures.

The final result was successful in 58 per cent of the cases in which the operation was nonelective, but every successful result in this group of cases represents a salvaged extremity or life. A large number of the failures were initial failures. The number of late failures was low (table 3).

There were no late failures in cases in which an elective or nonelective operation was performed for an aortic aneurysm. All of the failures were initial failures and were due to death of the patients.

TABLE 3

LATE FAILURE OF ARTERIAL HOMOGRAFTS AFTER NONELECTIVE OPERATIONS

YEAR	CASES*	AORTO-ILIAC GRAFTS	FEMOROPOPLITEAL GRAFTS
1954	5	0	1
1955	27	0	1
1956	45	4	6
1957	58	1	7
1958†	29	0	0

*The figures in this column represent the number of nonelective operations that were performed in the respective years.

†Prior to June 1, 1958.

We have made a histopathologic study of homografts which have been inserted in 33 cases. In three cases, the specimens were obtained at necropsy; in 30 cases, they were obtained when a regrafting operation was performed. In 28 of the 33 cases, the graft had failed because of the progression of arteriosclerosis in the portion of the involved artery distal to the graft. In these cases, the graft was essentially free of disease or defect. In one of the five remaining cases, arteriosclerosis had developed in the graft. A dissecting aneurysm had developed in one case. Multiple aneurysms had developed in another case, but the graft was still patent. In this case, the graft was a cut-down thoracic aorta, which was sutured along its entire length. Saccular aneurysms had developed in two cases.

Summary

Great progress has been made in the treatment of arteriosclerosis obliterans and aneurysms, and the surgical treatment of these diseases now will produce excellent results in a large majority of cases. It is apparent that most failures of arterial homografts occur within the first year after operation. If the patient survives for one year without failure of the graft, there is little likelihood that the graft will fail subsequently.

Pernasal Transsphenoidal Yttrium Implant of the Hypophysis

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In 1953 Luft and Olivecrona[1] demonstrated the beneficial results that could be obtained with hypophysectomy in certain cases of advanced cancer. After much experience it now appears that only those patients who have hormone-dependent cancers of the breast and prostate are likely to benefit.

As a result of the interest in hypophysectomy, numerous routes to the gland have been used and methods of excision or destruction employed. The aim, of course, is to devise a simple operation which will cause minimal distress to the patient, as many of those coming to this type of surgery are severely debilitated. At the same time it is necessary to ensure effective destruction or removal of the gland.

It may be well to recall some of the routes which have been used in the past to reach the hypophysis. Although the transcranial route was one of the first to be used, the mortality rate was so high that by the end of the first decade of this century interest was being developed in the nasal routes. But even with the transseptal route,[2] lateral rhinotomy,[3,4] sublabial routes[5-7] and their numerous modifications,[8-10] the mortality rate in some series ran as high as 30 per cent. By the 30s the great advance in neurosurgical technics and the need to remove totally, rather than partially, tumors involving this gland, made the transcranial approach once more the route of choice. With the advent of the sulfonamides and antibiotics the mortality rate of this procedure steadily declined. That this route was used by Luft and Olivecrona for excision of

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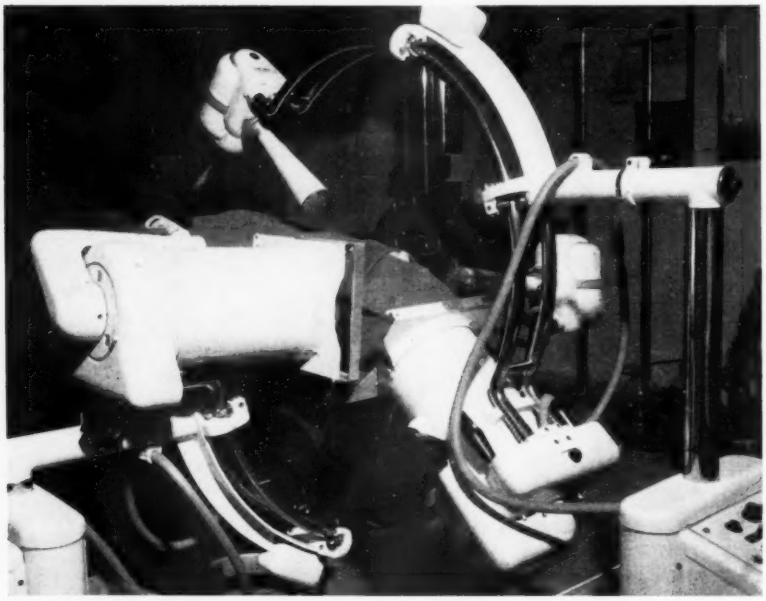


FIGURE 1. The patient in position on the table with his neck and head extended. Image intensifiers are draped during operations.

the gland during their pioneer work is not surprising.

The report by Forrest and Peebles-Brown[11] in 1955 renewed interest in the nasal route and numerous modifications have been devised. But these routes are used mainly for the introduction of radioactive compounds rather than for surgical excision of the gland.

As regards the destruction of the gland, probably the greatest experience has been with surgical excision. However, an increasing number of patients are being subjected to procedures in which the gland is necrotized by implanting radioisotopes. External radiation methods, such as proton beam therapy, are at present in an experimental stage and experience with them is very limited.

The method devised is based mainly on the work of two groups, one at the University of Chicago and the other at the University of Glasgow.

In 1953 Rasmussen, Harper and Kennedy,[12] of the University of Chicago, suggested that yttrium 90, a pure beta emitter, if implanted in the form of multiple discrete beads, as described by Kisieleski, Svihla and Brues[13] in 1950, could effectively destroy the hypophysis. The transcranial route was used for placement of the beads, and in practice it has become obvious that even though the gland is under direct vision at the time of operation, accurate deposition of the beads is exceedingly difficult. Unfortunately, due to the very nature of the operation, it is difficult to obtain a field free of metal impedimenta and to position the patient's head so that the use of continuous radiologic control is practical. Furthermore, the operation is attended by the usual mortality rate associated with such a neurosurgical procedure under general anesthesia.

Forrest and his associates,[14] of the University of Glasgow, reported in 1956 their results obtained by implanting radon, a source of gamma rays, in the form of two tubes by the pernasal transsphenoidal route with the assistance of a complicated head holder and needle director. The procedure is controlled by intermittent radiography. Radon was used because Pattison and Swan[15] in 1938 successfully treated a case of basophil adenoma of the pituitary by introducing two radon tubes into the sella turcica through the transcranial approach. However, Forrest found that the gamma irradiation required to destroy the pitui-

FIGURE 2. Special instruments for introducing yttrium beads.

a. Stylet which passes through cartridge (c) and cannula (b).

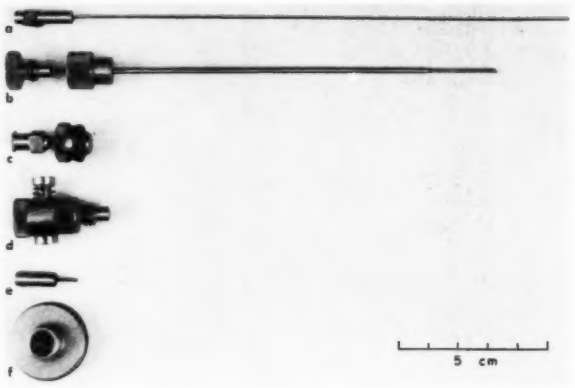
b. Trocar and cannula (17 gauge).

c. Adapter for connecting syringe to cannula (b) during instillation of penicillin-thrombin solution.

d. Cartridge. When mounted on stand (f), bead is dropped into left end and pushed home with cartridge pin (e), while spring on transverse cylinder is compressed; on releasing spring, bead is trapped in cylinder. Quartz window permits observation of bead on its way through cartridge when stylet (a) is introduced.

e. Cartridge pin.

f. Stand for cartridge during loading.



tary also affected surrounding structures such as the optic nerves. Therefore, yttrium 90, with its high activity over a short radius, is now being used.

From the experimental work of Marinelli, Quimby and Hine,[16] it was considered that complete destruction was more likely to follow the implant of multiple discrete sources of yttrium, 1 mm. by 2 mm., rather than the two larger sources, 2 mm. by 6 mm., as used by Forrest. However, it was obvious that the nasal route held many advantages, the most important of which was the lower mortality rate. Furthermore, adequate local anesthesia was considered sufficient to perform the nasal operation, a considerable advantage when dealing with these rather debilitated patients.

It was felt that only under direct vision could the needle be directed through the nose to the anterior wall of the sphenoid sinus without injuring the nasal mucosa and that only with the assistance of image intensifiers (Müller Surgex Units with Phillips Intensifier Tubes) could multiple yttrium beads be deposited with any degree of accuracy throughout the pituitary gland. The image intensifiers permit continuous fluoroscopic guidance throughout the procedure without exceeding the permissible exposure dose to the surgeon.

The method evolved is as follows: Under premedication of 180 mg. of NEMBUTAL®, given two hours, and 100 mg. of DEMEROL® hydrochloride, given one hour before operation, the patient is brought to the operating room and very carefully positioned on the table with the occiput low in a modified Rose position (figure 1). The reason for this position is to allow the axial image intensifier to be brought into place. This positioning must be done with great care and gentleness in those patients with spinal metastases, as any severe degree of cervical extension will result in pain.

Local anesthesia is then induced by instilling 0.5 cc. of 10 per cent cocaine into each nostril with the head in three positions, first with the head turned to the left, then to the right and, finally, in the midline. Occasionally when the optimum position of the head and neck cannot be obtained the anesthesia is supplemented with a Sluder block.

At this stage the face is prepared and drapes are applied. The two intensifiers are draped and brought into position. The yttrium beads, 1 mm. by 2 mm. with an activity of approximately 1 mc, are then loaded into the cartridges under water. One centimeter of water gives adequate shielding from the irradiation of these beads.

The strengthened 17 gauge needle (figure 2) is then passed into the left nostril and guided under direct vision to the anterior wall of the sphenoid sinus. Here the position of the tip and direction of the needle are checked by the intensifiers in both the axial and lateral views before the tip of the needle is advanced into the sphenoid sinus. Into the sinus is instilled 1.5 cc. of a penicillin-topical thrombin

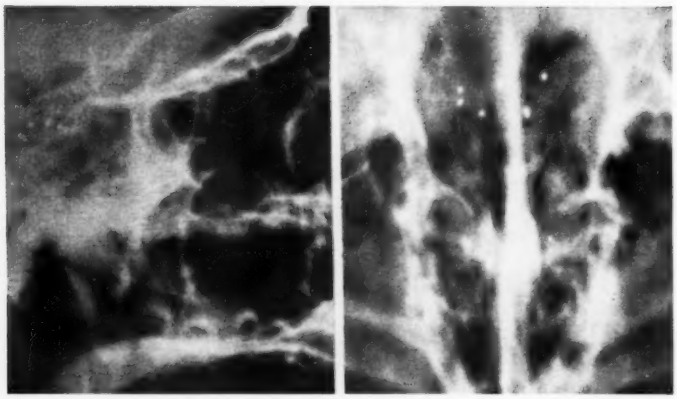


FIGURE 3. Implant obtained in case 1. Lateral and axial views.

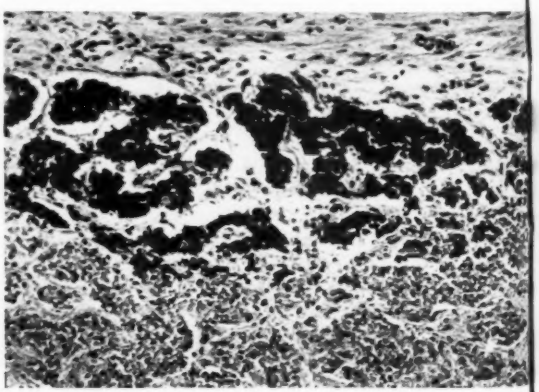
solution, each cubic centimeter of which contains 10,000 units of penicillin and 200 units of thrombin. Under continuous guidance the needle is advanced into the medial portion of the left half of the pituitary. A posterior bead is deposited before withdrawing the tip a few millimeters and depositing an anterior bead. The tip of the needle is then withdrawn into the sphenoid sinus and the needle angled laterally before being advanced once more into the gland. Again a posterior and an anterior bead are deposited, this time in the lateral portion of the left half of the gland. Similar maneuvers are also carried out on the right side. (Figure 3.)

Generally eight beads are implanted, but as many as 11 and as few as six have been used. Variations in the size of the sella and the accuracy of deposition of individual beads determine the total number deposited. Variations in the position of the nasal and sphenoidal septum can be inconvenient but do not prevent an adequate implant. Serial sectioning of the few pituitaries obtained at autopsy has revealed that an average of better than 90 per cent destruction has been obtained by this method. (Figures 4 and 5.)

Even severely debilitated patients stand the outlined procedure very well. On two occasions, however, it has been necessary to give an additional 50 mg. of Demerol intravenously while the patient was on the table. Only one

FIGURE 4. Case 1. Pituitary obtained 15 days postoperatively, showing almost total destruction. Hematoxylin-eosin stain, x 9.

FIGURE 5. Surviving cells. Note sharp line between the surviving and necrotized cells. Hematoxylin-eosin stain, x 150.



patient was deemed unfit for operation, when she became drowsy and confused on the day tentatively planned for operation; she died nine days later.

Maintenance

All patients subjected to this procedure have required a maintenance dose of cortisone which has averaged 50 mg. daily. PITRESSIN® tannate has been administered to those patients in whom diabetes insipidus has developed. Thyroid replacement therapy has not been started until signs of hypothyroidism develop and this does not occur for at least two months postoperatively.

Material

Although some 40 of these operations have now been carried out since June 1957, only the first 26 will be reviewed, for at least two months are required to determine the effects of the procedure. These cases were unselected insofar as no consideration was given to the age and general condition of the patient, the type of the primary tumor or site of metastases, and the previous treatment received by the patient. The patients were all considered unlikely to benefit from further conventional surgery, radiotherapy or endocrine therapy. Moreover, the early operations were on patients who were in a very advanced or even terminal stage of metastatic disease.

Mortality

Of the 26 cases under review there were no deaths directly due to the procedure. One patient died two months postoperatively and from the doctor's account of the terminal stage, death probably resulted from meningitis. Unfortunately, autopsy was not obtained. A permanent cerebrospinal rhinorrhea developed two weeks postoperatively; although the patient returned to the hospital, it was decided she was unfit to undergo transcranial closure of the defect, and she was sent home again. This indicates rather well the "poor risk" patients who tolerate the procedure so satisfactorily.

One or more complications developed in 13 of the 26 patients in the series (table 1). By far the most frequent complication, ocular nerve paralysis, developed in no less than 10 patients. Eight had a third nerve paralysis either alone or in combination with paralysis of the fourth nerve. This is embarrassing for the patient due to the drooping of the lid but is no real handicap. A temporary sixth nerve paralysis which occurred in two patients was rather distressing due to the double vision which resulted. In one case the third nerve paralysis started to clear after being present for two months.

TABLE 1

COMPLICATIONS IN 26 OPERATIONS

COMPLICATION	NUMBER
Extraocular nerve palsies	10
Cerebrospinal rhinorrhea	4
Meningitis	2
Anesthesia of face	1

Examination of pituitaries obtained at autopsy has confirmed the suspicion that these paralyses arise from placing beads too far laterally. The technic has been modified accordingly. Surgical trauma at the time of operation plays no part in this complication as the onset of paralysis is from the third to the sixtieth day.

Using this route it was expected that cerebrospinal rhinorrhea might occur and this has been so in four patients. In two patients it lasted for a number of months. One was the patient already mentioned in whom meningitis was the suspected cause of death two months postoperatively. The other was a man who had metastatic carcinoma of the prostate. The rhinorrhea lasted two and a half months but he has now returned to work. The two other cases of rhinorrhea were of a very temporary nature.

Starting with the twentieth case topical thrombin has been injected into both sphenoid sinuses, with penicillin, at the time of operation as indicated. It is interesting that all these cases of rhinorrhea occurred after the first 14 operations. But this complication still occurs. In the last 26 cases two patients have had temporary rhinorrhea.

TABLE 2

OPERATIONS PERFORMED

REASON	NUMBER
Metastatic carcinoma of breast	21
Metastatic carcinoma of prostate	4
Metastatic carcinoma of ovary	1
TOTAL	26

TABLE 3

RESULTS IN 21 CASES OF CARCINOMA OF THE BREAST

Patients living	
Unchanged	5
Improved	10
Patients who died later	
Unchanged	5
Improved	1

Meningitis was encountered twice. The first occurrence was in the patient in whom this complication was the suspected cause of death; the other was in a patient who, against advice, blew her nose vigorously and experienced a temporary leak of cerebrospinal fluid. The meningitis in this case responded to antibiotic therapy and the rhinorrhea ceased.

During two procedures pellets were misplaced. In one it is assumed that they entered the cranial portion of the left carotid artery and were whipped into its branches. Two settled in the distribution of the middle cerebral artery of the same side, and another entered the circle of Willis, crossed to the other side and came to rest in the distribution of the anterior cerebral artery. There were no aftereffects.

In the other case a pellet came to lie at the right petrous apex. As a consequence of this the patient has a mild sensory loss on the right side of her face in the distribution of the ophthalmic and maxillary divisions of the fifth nerve.

Although the complication rate in this series has been fairly high, it can be reduced with experience. This is evidenced by the absence of any complications following operation in the last 10 patients subjected to this procedure since December 1, 1957.

There have been no instances of anosmia, visual field impairment, frontal lobe or hypothalamic damage or brain abscess formation such as have been reported in other series.

Results

Of these 26 patients, 21 had a primary lesion of the breast, four of the prostate and one of the ovary (table 2).

Twenty of the patients with metastatic cancer of the breast were women; one was a man. Eleven appeared to benefit from the operation (table 3). The estimation of the result of the operation is based on clinical observations, such as cessation of vomiting, increase in appetite, weight gain, changes in size of cutaneous or subcutaneous lesions, and x-ray studies of metastatic lesions. Symptomatically, relief of pain has been the most dramatic feature in those gaining benefit from the proce-

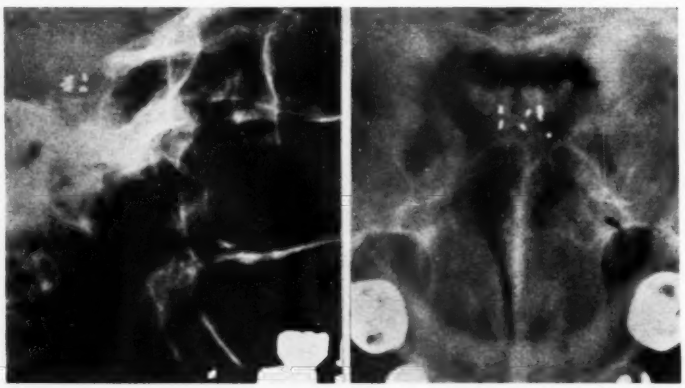


FIGURE 6. Case 9. Lateral and axial views of implant.

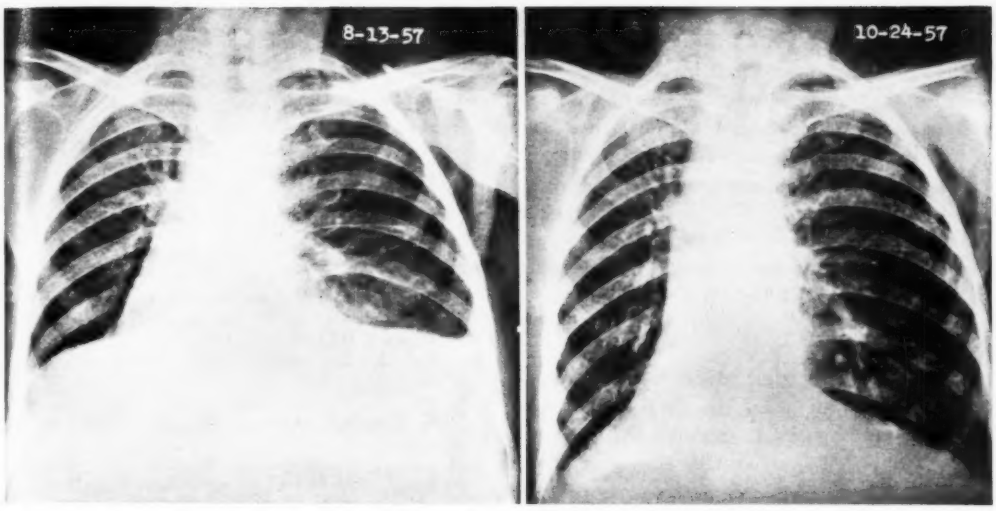


FIGURE 7. Case 9. X-rays of lungs before and 10 weeks after operation.

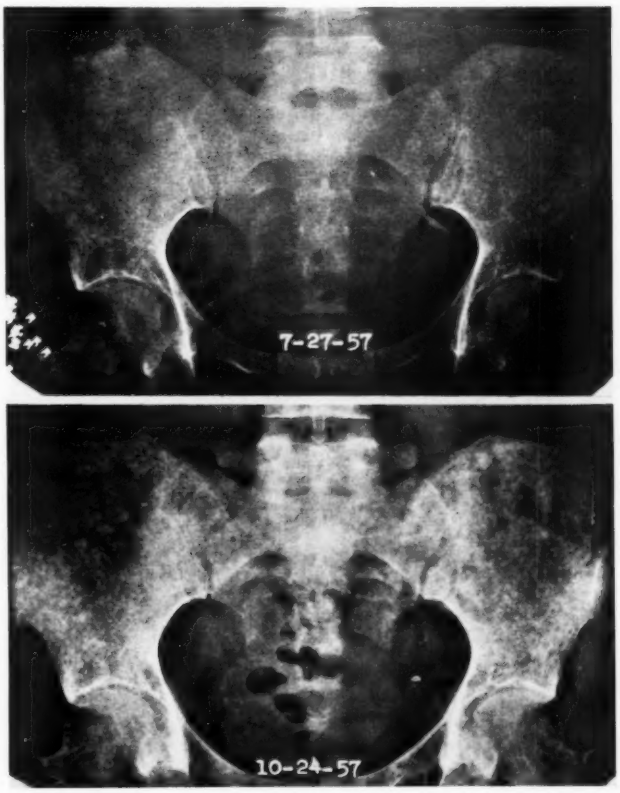


FIGURE 8. Case 9. X-rays of pelvis before and 10 weeks after operation.

dure. However, only four patients have shown a true regression with sclerosis of osteolytic lesions, etc. (Figures 6 to 8.)

All four patients with carcinoma of the prostate showed improvement after yttrium implant. Improvement was evidenced by return of appetite, disappearance of bone pain, resumption of ambulation or return of normal urinary function.

The patient who had metastatic carcinoma of the ovary did not benefit from surgery.

Conclusion

As has been stated, virtually all patients referred with advanced cancer of the breast and prostate have been accepted for this procedure. It is felt that with better selection of cases the percentage of patients benefiting will increase, and with more experience and knowledge gained from autopsy studies the complication rate will continue to decrease.

Summary

Routes to the pituitary gland and methods of destruction are reviewed. A simple method of yttrium implant of the hypophysis with continuous fluoroscopic control and using local anesthesia is outlined. The results of 26 such procedures performed on patients with advanced cancer are presented.

ACKNOWLEDGMENTS

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Conservative Treatment of Endometriosis

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ENDOMETRIOSIS may be defined as the presence of functioning endometrial tissue that is outside its normal situation but usually confined to the pelvis in the region of the ovaries, uterosacral ligaments, cul-de-sac peritoneum and uterovesical peritoneum. Development and extension of endometrium into the myometrium (adenomyosis), which seems unrelated histogenetically and is characterized and determined by an entirely different history and pelvic examination, will not be discussed in this presentation.

The disease process of so-called external endometriosis is unique in that it spreads by a cancerlike type of invasion, with subsequent fibrosis. Although the cellular pattern is benign, it produces an extensive amount of havoc in the pelvis. There may be ovarian destruction, tubal deformity, bladder dysfunction and large bowel obstruction. Periureteric fibrosis, with later dilatation and obstruction, has been reported with increasing frequency, and isolated areas of endometriosis have been found in the umbilicus, pleura, arm, thigh, lung, pelvic lymph nodes and perineum. Such widely separated sites have been in part responsible for the multiple theories of pathogenesis. Although most cases of endometriosis may be explained on the basis of either (1) retrograde menstruation through the oviducts, with implantation and involvement by contiguity, or (2) coelomic metaplasia of totipotential epithelium, sporadic case reports have brought forth theories of lymphatic spread or vascular dissemination.

Endometriosis is characterized symptomatically by progressive, increasingly severe pelvic pain associated with or occurring just prior to menstruation. The crippling characteristics of this malady, occurring during the reproductive period, prevent fulfillment of marital potential, since sexual intercourse often is pain-

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ful and conception is frequently impossible.

The management of endometriosis may be considered under two general headings: definitive and palliative. A third method, although conjectural, may be termed prophylactic. Definitive treatment has all too often been surgical, i.e., by complete hysterectomy and castration, with subsequent development of neuroses and occasional psychoses. It is important, therefore, that a conservative approach to therapy be initiated and repeated as often as seems necessary to afford comfort and to avoid spread of the disease.

Definitive Treatment

The only complete and therefore definitive treatment of endometriosis is castration by either surgery or x-ray. If the patient has extensive symptomatic endometriosis and is past the childbearing age or has already had children, there really is no problem, since complete hysterectomy and bilateral salpingo-oophorectomy will result favorably in almost all cases. This treatment is by no means radical, since abnormal bleeding, pelvic pain, dyspareunia and the troublesome pelvic mass are no longer problems for patient or physician.

In women less than 45 years of age or in the premenopausal era in general, there has been some question about not removing one or both ovaries at the time of hysterectomy. In the presence of endometriosis, I routinely perform bilateral oophorectomy, since it has been shown that ovulation persists after hysterectomy. This procedure is also indicated by the fact that Scott has shown experimentally in monkeys that the *intermittent* administration of estrogen and progesterone is associated with the highest incidence of growth of aberrant endometrial tissue. It is therefore deemed inadvisable to have persistent ovulation if areas of endometriosis remain which may be stimulated to recurrent activity. This is of even greater importance if bowel and ureteral obstructive processes have been present.

Patients who have had complete hysterectomy and bilateral salpingo-oophorectomy should not, however, be made to bear the discomforts or undergo the extragenital metabolic derangements associated with surgical ablation of the ovaries. It has been my policy to begin therapy with estrogenic substances on the fourth or fifth postoperative day after hysterectomy-castration and continue this indefinitely although in diminishing dosage. Hot flushes, sweats, insomnia, nervousness, senescent vaginitis and dyspareunia may be prevented (or alleviated if therapy is not started at once) by the following schedule: 0.05 mg. ESTINYL® daily at bedtime for three months, then every other day for three months, and then every third day for as long as necessary. If Estinyl is not tolerated, 12 mg. TACE® or 1.25 mg. PREMARIN® may be utilized in the same sort of schedule. The use of estrogen in this fashion prevents the development of disorders of lipoproteins, which have recently gained prominence as being associated with premature development of cardiovascular disease in castrated but untreated women.

The wide variety of available estrogenic substances provides the clinician with sufficient agents so that if one is not tolerated another usually is. I have observed no untoward reactions in patients who receive estrogenic therapy for residual endometriosis after hysterectomy and castration. By contrast, patients who have had years of discomfort because their physician was reluctant to allow this type of treatment have experienced marked improvement after estrogenic therapy. There is no available evidence at present to substantiate the theory that the use of such exogenous estrogens will increase the chance that breast carcinoma will develop in these persons.

X-ray therapy is used to effect castration in patients with endometriosis only when extenuating circumstances prevent operation. Results which I have achieved from this method have not been desirable. Studies of urinary estrogens have shown that the ovary may still remain active and that ovulation may occasionally occur even after the usual sterilizing dose of x-ray. Late radiation complications such as small bowel obstruction and fistulas have been seen in such patients; it also has been my misfortune to have primary ovarian or endometrial carcinoma develop in patients previously treated by radiation. Therefore, if definitive

therapy is a necessity, it is suggested that the patient will receive the most benefit from a complete hysterectomy and bilateral salpingo-oophorectomy, with the administration of exogenous estrogens started in the immediate postoperative period.

Palliative Treatment

Palliative treatment of endometriosis may be considered in three categories: (1) observation and analgesia, (2) suppression of ovulation, by either hormones or pregnancy, and (3) conservative surgical procedures.

Observation and analgesia—Until the time of spontaneous menopause or hysterectomy-castration, every patient who is suspected of having endometriosis should be examined carefully at regular intervals of not longer than six months. The vagaries of the growth pattern of this disease necessitate this close observation. The presumptive diagnosis is usually made on the basis of characteristic symptoms or typical physical findings, or both. The usual finding at pelvic examination is a firm nodularity of the uterosacral ligaments, with obliteration of the posterior cul-de-sac and fixation of the uterus in third degree retroversion. This is best palpated by rectovaginal examination.

If the symptoms are minimal and the evidence of endometriosis is confined to slight tenderness and nodularity of the cul-de-sac, the patient may be treated expectantly by reassurance and mild analgesics such as EDRISAL®, Darvon or codeine. Early pregnancy is strongly urged in the married patient, and it is further suggested that she have her children in as quick succession as possible. If abnormal bleeding is troublesome a careful examination under anesthesia and thorough uterine curettage should be carried out.

When infertility is an associated problem every effort should be exerted to determine its cause, and early treatment should be rendered. In such cases I have found it worthwhile to perform tubal (carbon dioxide) insufflation for three consecutive months just prior to the estimated time of ovulation, with planned coitus immediately following. Since the etiology of infertility associated with endometriosis is unknown but is assumed to be a failure of tubo-ovarian mobility, such insufflations may be valuable in restoring temporary anatomic proximity.

At the time of follow-up examination both ovaries should be carefully palpated and changes in size and mobility noted. Progressive obliteration of the cul-de-sac or the development of rectovaginal masses should suggest progression of the disease, and other methods of treatment should be tried. Simple observation as a form of treatment is frequently rewarding, since many such patients either "outgrow" endometriosis or become pregnant and are not troubled again. It is entirely possible, however, that an incorrect diagnosis had been made and that endometriosis was not present in the first place. Yet it is known that many patients have extensive endometriosis with few or no symptoms, and that spontaneous remissions and "cures" occur often enough to be considered as part of the natural history of the disease. It is a serious error to mistake carcinoma of the ovary for endometriosis and to suggest observation for prolonged periods of time. There is no absolute way of avoiding this catastrophe, but repeated pelvic examinations and a strong index of suspicion should lead the clinician to perform an operation.

Endometriosis improves during periods of either artificially or naturally induced anovulation. It has been suggested that pregnancy is the best prophylactic and therapeutic treatment. This theory is supported by the work of Scott, which was previously mentioned. Scott also has pointed out other clinical features of the disease pertinent to its relationship to ovulation: (1) Endometriosis is a benign growth limited to the years of menstrual function. (2) Barring malignancy, it does not grow postmenopausally. (3) It occurs infrequently in the teens. (4) The highest incidence is in the late fourth and early fifth decade of life. (5) Delayed childbearing is associated with an increased incidence. (6) Five years without a pregnancy predisposes to its growth and symptoms. (7) During pregnancy and for an interval following, the growth of endometriosis is retarded.

Use of hormones—Estrogens—The absence of symptoms and the regression of palpable endometriosis during pregnancy, when there are high concentrations of estrogen and progesterone, have led to the use of these hormones in treating this condition.

Estrogens have been utilized for many years, and their efficacy has been championed by Karnaky, who effected exhaustion atrophy of the endometriosis by using extremely large doses of micronized stilbestrol in combination with certain vitamins. Haskins suggested the use of stilbestrol in the following regulated scheme to prevent breakthrough and withdrawal bleeding: Administer 1 mg. stilbestrol, beginning on the first day of the menses. Increase this by 1 mg. every three days to a total of 5 mg. per day. The patient is then given scored 25 mg. tablets, and the dosage is increased by one-fourth tablet (6.25 mg.) every three days to a total daily dosage of 100 mg. This is continued for an average period of three months. The dosage is then decreased by one-fourth tablet (6.25 mg.) daily until the last dose is taken. All patients so treated had a complete remission of symptoms during the period of treatment, but 5 of 15 patients had recurrences in from 1 to 39 months.

The unpredictability of permanent relief following the use of estrogenic substances has become apparent during the last few years. This may be due to the fact that some areas of endometriosis do not respond to estrogenic substances as well as the endometrium does: or, perhaps, the temporary improvement is mediated via the pituitary through suppression of ovulation. The development of endometrial hyperplasia with breakthrough bleeding and profuse withdrawal bleeding has also made this method difficult to manage in certain cases.

Androgens—The use of androgens to palliate the symptoms and signs of endometriosis has received wide acclaim, yet this method of treatment has not been universally accepted. This is probably due to the unpredictable and undesirable side effects of male hormones, such as hirsutism, acne and deepening of the voice. Even small doses of androgens may produce these symptoms in some persons. Unfortunately the hirsutism induced by androgens does not always disappear, a situation not to be taken lightly, especially by the patient. However, Creadick has reported excellent results using 10 mg. methyltestosterone (METANDREN®), administered orally, for two menstrual cycles, then omitting therapy for one cycle. Twenty-five women were so treated and 15 subsequently became pregnant. All but two were relieved of pain, and palpable lesions regressed in all but one. Simmons also had good results with a similar scheme, using only 5 mg. ORETON® daily, administered sublingually, for 100 days. He stated that side effects are minimal and that this dose does not inhibit ovulation. The action of androgens in higher dosage is mediated through the pituitary, with inhibition of ovulation and subsequent ovarian inactivity. In lower doses the effect must be a direct one on areas of endometriosis, since ovulation persists and pregnancy has occurred even while patients have been undergoing treatment.

Wied, Del Sol and Dargan have reported recently that observations of vaginal smears of patients who have been castrated and have been given daily androgens and estrogens showed regression of epithelial proliferation from cornified to noncornified superficial cells. A similar effect on aberrant endometrium may be surmised.

Some caution must now be exerted in regard to administration of androgenic substances during early pregnancy, since recent case reports by Wilkins have implicated some of the newer testosterones in the etiology of congenital abnormalities of the external genitalia of female infants born of patients who were receiving these drugs during the first 12 weeks of pregnancy. Such anatomic variations suggest a cause-and-effect relationship between androgen dominance and organogenesis during the time of differentiation of the external genitalia. More controlled clinical studies and animal experimentation are needed before the total influence of androgens can be adequately evaluated. I have not used male hormones in endometriosis and therefore cannot offer first-hand criticism of this method of treatment.

Progestins—Based on the premise that nor-

mal pregnancy improves endometriosis both subjectively and objectively, I have induced a state of pseudopregnancy by the continuous administration of estrogens and progestins for periods of two to nine months. It is suggested that the changes which pregnancy produces in endometriosis are due to a combination of (1) anovulation and amenorrhea, (2) decidual transformation of functioning endometriotic tissue, and (3) decidual necrosis and absorption. At the present time the optimum method of producing this pseudopregnancy is by use of norethynodrel (17 alpha-ethynyl-17-hydroxy-5 [10]-estren-3-one), available as ENOVID®. This is an orally effective, potent progesterone which produces a decidual change in the endometrium, a thermogenic response as measured by basal body temperatures, a progesterone effect in cervical and vaginal smears, and a sharp reduction in gonadotropic excretion in human subjects. Strong circumstantial and direct evidence indicates that ovulation is inhibited. The recommended dosage is 10 mg. (one tablet) daily for two weeks, starting on the fourth or fifth day of the menstrual period, then 20 mg. daily for two weeks, then 30 mg. daily for two weeks, and, finally, 40 mg. daily for as long as therapy is deemed advisable.

Side effects include mild nausea, breast soreness and increased appetite with weight gain. Only a few patients have reported breakthrough bleeding, which has not necessitated discontinuing therapy. It should be remembered that Enovid contains a small amount of ethinyl estradiol as a desired addition so that a true estrogen-progesterone combination is being given. Without this added estrogen, breakthrough bleeding is increased. If the nausea is bothersome the patient should be instructed to take the medication with a glass of milk just before retiring.

Endometrial biopsies taken during the course of therapy have shown (1) the development of an active decidua, (2) arrest of the endometrial glands, (3) later focal decidual necrosis, and (4) diminution in the amount of tissue actually obtained by biopsy, suggesting exhaustion atrophy of endometrium. In several patients who were operated on following the administration of Enovid, these same changes were found in areas of endometriosis. While there is no doubt that subjective and objective improvement of endometriosis is attained during the period of pseudopregnancy, determination of the semipermanent or permanent effects awaits follow-up observation.

Surgical procedures—Surgical intervention in patients with endometriosis undoubtedly plays an important part in the conservation of pelvic organs, in relief of pain, and in the improvement of fertility status. It has been estimated that about 20 per cent of patients who have symptomatic endometriosis eventually will have operations. Of course, this figure will vary, depending on the zealousness of the surgeon and his previous results with conservative nonsurgical procedures. It is perhaps trite to say that individualization is necessary, but selection of patients for operation depends on a multiplicity of factors: severity of symptoms, age, marital status, desire for children, status of the husband, removability of the lesion, presence of other pelvic disease, and the general psychologic state of the patient.

Except in the rare case of a ruptured endometrioma, surgical intervention should not be hasty or ill planned. The best interests of the married patient are served when a complete infertility work-up is performed before laparotomy. This should include study of the husband, postcoital examinations, tubal insufflation or hysterosalpingography, and other pertinent laboratory tests. The therapeutic procedure previously outlined is a rational plan of approach in young women less than 35 years of age who have severe symptoms and objective evidence of disease. If simple analgesics and reassurance are inadequate, periods of anovulation are tried; at present, I am utilizing a six month period of pseudopregnancy as described. At the end of this time married patients are exhorted to become pregnant, and an effort to expedite this is made with repeated insufflations and planned coitus. If the patient fails to conceive after one year of concerted effort, operation is suggested. In the unmarried patient another trial of pseudopregnancy may be attempted if repeated pelvic examinations show that endometriosis is not progressive.

I have not been convinced that minor surgical procedures such as dilatation and curettage, insertion of stem pessaries, or the use of Smith's or Hodge's pessary to hold the uterus anterior have influenced the natural history of the disease. I have not found that "regurgitation" of endometrium is more common in women with cervical stenosis or an acutely angulated uterus. Furthermore, it is extremely difficult to bring the uterus into anterior position at the time of operation prior to having freed the posterior aspect of the cervix and fundus from the dense endometriotic adhesions in the cul-de-sac. Thus, if the uterus can be replaced easily and a pessary inserted to hold it in position, the extensiveness of the endometriosis may be doubted.

Surgical intervention is usually scheduled at a time just after the menstrual period in order to avoid the pelvic congestion of the secretory phase. A preliminary course of Enovid for one month prior to operation has seemed to simplify dissection in difficult cleavage planes. The actual surgical procedures include excision or fulguration of all available areas of endometriosis on the peritoneal surfaces in the cul-de-sac, bladder flap, round ligaments, uterosacral ligaments or sigmoid. Ovaries are resected if involved. Pregnancies have been reported after unilateral oophorectomy and excision of most of the remaining ovary, so that even if only a small remnant of ovarian substance remains the uterus should be preserved. If pelvic pain has been a prominent factor, a presacral neurectomy is performed; recently, I have also resected a large segment of both uterosacral ligaments with interposition of peritoneum, as recommended by Doyle. Ovarian neurotomy by division of the infundibulopelvic ligament has not been deemed necessary. If the ovaries are densely adherent in the posterior cul-de-sac they are brought forward and suspended by a modified Olshausen technic. Postoperatively the patient is again made anovulatory for a period of three to four months. In the past this was accomplished by giving 0.05 mg. Estinyl twice daily, but at present I am utilizing the following dosage of Enovid for this purpose: 10 mg. daily for two weeks, then 20 mg. daily for two weeks, and then 30 mg. daily for two to three months.

Results from such a surgical plan vary considerably, but relief of pain is almost always immediately obtained. The incidence of subsequent pregnancy in various studies has been about 40 per cent. At the Free Hospital for Women, Bacon reported that 27 per cent of 138 patients treated by conservative surgical procedures delivered normal infants although the interval from operation to delivery averaged 2.7 years. Other studies have given pregnancy incidences from 20 to 70 per cent, but because the exact relationship of endometriosis to infertility is unknown the rationale for improvement in infertility following such a nonspecific operation is unknown. Similarly, the incidence of recurrence and subsequent hysterectomy-castration varies considerably from author to author. In our own patients, reported by Bacon, the incidence of recurrence was 30 per cent. All patients were treated by subsequent hysterectomy, laparotomy or x-ray. Although x-ray has been suggested for the treatment of recurrences, we are now reluctant to use it and would rather attempt hormonally induced anovulation. If this is unsuccessful, a definitive operation in the form of complete hysterectomy and bilateral salpingo-oophorectomy is done. As was previously stated there is no harm in giving such patients small amounts of estrogen over a limited period for relief of menopausal symptoms. If there is extensive involvement of the bowel by endometriosis (excluding complete obstruction), it is better to perform bilateral oophorectomy than to do extensive bowel resections.

Prophylaxis

The method of prophylaxis in endometriosis has been questioned by many. However, the studies of Meigs in regard to delayed marriage and childbearing as etiologic factors seem incontrovertible. If this is feasible, it is most desirable that women who have endometriosis marry early and reproduce quickly and regularly. Reasoning teleologically, it is natural for women to marry in the late teens and early twenties and to interrupt the periodicity of ovulation from time to time by pregnancy.

Why endometriosis does not develop in some women who do not follow this pattern is just as enigmatic as the fact that some women with extensive endometriosis do not have pain. If marriage is not contemplated, it seems reasonable to produce a pseudopregnancy with exogenous hormones, as described. Although it is a theoretical assumption, I have suggested that pregnancy (or pseudopregnancy) brings about a decidual reaction in the areas of endometriosis, which then undergoes necrosis and absorption.

Summary and Conclusions

1. Endometriosis is a benign disease with certain malignant characteristics. It may result in ovarian destruction, deformity of the oviduct, bladder dysfunction, and large bowel obstruction. Absolute infertility is present in about 30 per cent of cases.

2. Definitive treatment has too often been surgical, in the form of complete hysterectomy and bilateral salpingo-oophorectomy.

3. Endometriosis seems to occur after prolonged periods of ovulation (five years or more). Periods of anovulation, as brought about by pregnancy, seem to prevent the development of the disease and to provide palliation from symptoms after it has developed.

4. Repeated pregnancies may provide a prophylactic method of therapy.

5. Palliative therapy includes observation and analgesia, hormonally induced anovulation and conservative surgical procedures.

6. Pelvic examinations should be performed every six months during periods of observation to make certain that dissemination of the disease is not occurring.

7. Anovulation for periods of five to nine months may be brought about by estrogens or progestins or combinations of each. This pseudopregnancy results in amelioration of symptoms and regression of the endometriosis as long as the treatment is continued.

8. Androgens may be utilized with care; they seem to be effective without producing anovulation.

9. Conservative surgical procedures consist of excision of areas of endometriosis, resection of ovarian cysts, presacral and uterosacral denervation, and uterine suspension. Preoperative anovulation with norethynodrel seems to simplify difficult operations.

10. A bilateral oophorectomy should always be performed with a complete hysterectomy for endometriosis, since subsequent ovulation is then impossible. Exogenous estrogens may be given to prevent symptoms of and metabolic derangements associated with "hypoestrinism."

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Principles and Possibilities in the Treatment of Deafness

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I BELIEVE that the most dramatic and the most tragic case of deafness in the history of medicine was that of the famous composer Ludwig van Beethoven. A progressive destruction of hearing function over a 25 year period resulted in total deafness in this man to whom hearing was so important and who contributed so much to the listening pleasure of others. Although numerous otologists have attempted to diagnose the cause of Beethoven's hearing loss, none have been able to do so with any degree of certainty. Recently, an internationally known musician was progressively losing his hearing. Although he consulted the best-known otologists in the world, no one could help him. Just as in the case of Beethoven, no one could stop the progressive deterioration of his hearing ability.

H. G. KOBRAK

There has been absolutely no progress in the treatment of the type of progressive deafness which these two famous musicians had. However, our diagnostic ability has vastly improved. While we can only make informed guesses concerning Beethoven's deafness, we were able to make a clear diagnosis in the case of the contemporary musician. The reasons are clear. By means of the audiometer, we can now assess the exact quantity of hearing loss. With finer diagnostic tests we can make a differential diagnosis as to the site of the lesion, which is important to the doctor and the patient not only in deciding on the disposition of the case, but also in estimating the prognosis. I do not have to emphasize the importance of a correct prognosis. Neither the patient nor his family expects the doctor to cure every disease. They know that death is inevitable, and they realize that some diseases are progressive and incurable. Nevertheless,

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the patient and his family have the right to insist that the physician's diagnosis of incurability is correct.

Nerve Deafness

In evaluating the current status of nerve deafness, I must re-emphasize that there has been no important medical, surgical or pharmacologic progress in the treatment of this condition. However, there has been an important development in the realm of physics as it relates to this defect. The vacuum tubes, the transistors and the improved electric circuits have created possibilities for amplification of sound which can be utilized by patients as electronic hearing aids. We might paraphrase the slogan of the film producers: "Hearing aids are better than ever." Although this unfortunately does not mean that hearing aids are beneficial in every respect, they do help many patients; they are improving; and they are filling our own medical vacuum.

The most severe adverse factor in prescribing hearing aids is the prejudice which people have against them—a prejudice which assumes some very queer aspects. Too many patients seem to think it is not respectable to wear a hearing aid, and they are determined not to use one. If they finally are persuaded by the doctor and their family to wear one, they want to hide it. Therefore, it is placed under the coat, under the shirt, in the hair, or in some other hiding place. The shirt or coat rubs on the microphone and creates static disturbances which would not occur if the hearing aid were placed in the open, which is the best position. Of course, those in the hearing aid industry are aware of this desire to hide the instrument, and they cater to this ostrichlike feeling in the deaf patient. They camouflage hearing aids in every conceivable way; in addition, they consider only the factor of invisibility in making them as small as possible. Naturally, in order to build them in this way, the other important considerations of price and optimal performance are given secondary consideration.

The exaggerated desire to hide the hearing aid has caused a unique current development in hearing aids. Since no one is ashamed or afraid to wear glasses, manufacturers are now placing hearing aids in the temples of glasses; these are ideal hiding places near the ear, and the instrument is not encumbered by a rubbing shirt or coat. People have willingly accepted this device, and sales are very good. The hearing glasses have a second advantage for both the dealer and the customer. Glasses have two ear pieces; one hearing aid can be placed in the left temple for the left ear and one in the right temple for the right ear. This seems to be biologically advantageous for the patient, and it certainly is financially advantageous for the distributor, who can ring up a double sale. The only disadvantage seems to be in the condition of the patient's pocketbook after purchasing the hearing glasses.

The advantages of this type of instrument are important to the patient. Since both ears receive an amplified message he can enjoy improved directional hearing. In addition, he seems to be able to distinguish better between background noise and the desired signal. Apparently, the brain can discern better when both ears are stimulated. We will have to learn more about this in years to come, but I would like to say that binaural fitting with hearing aids should be encouraged if finances permit. Of course, this does not mean that the binaural hearing aid must be in the ear pieces of glasses. We know of patients with perfect eyesight who have bought glasses only to have hearing aids placed in the temples. Because they do not have defective vision, they wear window glass for lenses. It is indeed strange that a patient is willing to pretend that he has faulty vision only to hide faulty hearing.

I do not blame those in the hearing aid industry for perfecting a device which caters to the vanity of the person with defective hearing. They just surveyed the market from the psychologic as well as the physiologic viewpoint, and took advantage of an existing situation. However, the physician can play an important role in effecting an improvement in this situation, because he has more influence on public opinion than anyone else. He should tell his patients that there is no more stigma attached to a loss of hearing than to defective vision. He should have his patients wear their hearing aids in the open, and he should pre-

scribe that they be built according to the best specifications in a practical size for optimal performance.

Although the physician can do nothing medically or surgically to relieve nerve deafness, he can offer advice regarding the affliction to the patient's family. Having nerve deafness is similar in numerous ways to a person's being exposed to a foreign language in which he is not well versed. He can understand the language much better if he is close to the person who is speaking it, and if that person speaks slowly and distinctly. The family of a patient with nerve deafness should realize the necessity of speaking to him in this way. One should never shout to a patient with nerve-type defects in hearing. Adhering to these simple conditions should make the situation much less difficult for the patient as well as for his family.

Considering the lack of any real advance in treating this defect, the current picture of nerve deafness is a rather bleak one. Unfortunately, the contemporary musician whom I mentioned previously was a victim not only of defective hearing, but also of the unwarranted prejudice against wearing a hearing aid. He categorically refused to wear any such instrument. He lost all will to live, and he died of an intervening disease, not fighting for survival. This case is a sad illustration of the effects of the lack of progress in the century and a half since the time of Beethoven.

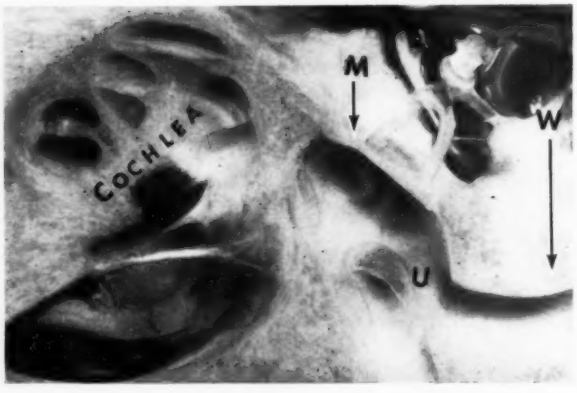

FIGURE 1. Specimen from a human cadaver, showing the area of the stapes, vestibule, lateral semicircular canal, cochlea and internal auditory meatus. If the stapes is ankylosed by otosclerosis, a window can be made in the semicircular canal (W) or the otosclerotic rigidity can be broken surgically in the oval window niche (M). The membranous canal, which is visible as it goes into the utricle (U), is the object of ablation in Meniere's disease. This operation, aimed at abolishing vertigo, nearly always destroys cochlear function.

Middle Ear Deafness

Although pessimism is apropos in considering the lack of progress in nerve deafness, we are most optimistic over the recent advancements in the treatment of middle ear deafness.

The first important forward step in treating this condition came with the introduction of the sulfonamides and penicillin in the late 1930s. These drugs were successful in combating inflammatory diseases, including specific inflammation such as scarlet fever; the grave destruction and hearing loss subsequent to middle ear infection no longer occurred as regularly. We older otologists remember well the extensive destruction and severe deafness which used to follow scarlet fever. Contrary to rumors, the introduction of the sulfonamides and penicillin did not eliminate the profession of otology. Now that he is freed from the drudgery of treating inflammatory infections, the otologist of today is able to concentrate on treating deafness.

The first attempt to create a standard operation for otosclerosis was made 75 years ago. The final and successful link in the long development of a surgical procedure for this condition was contributed in 1938 by Lempert, who perfected a one stage fenestration. The principle of fenestration is to overcome the fixation of the stapes by creating a new window. The Latin word *fenestra* (window) is the root of the term fenestration.

It may be important to emphasize that otosclerosis, as such, cannot be diagnosed while the patient is alive. Only the fixation of the stapes, which is caused by the lesion, can be diagnosed clinically. In order to make a scientific diagnosis, an autopsy must be performed and a histologic section prepared, such as is shown in figure 1. The size of the otosclerotic lesion in no way determines the success of a fenestration. However, it is important that the

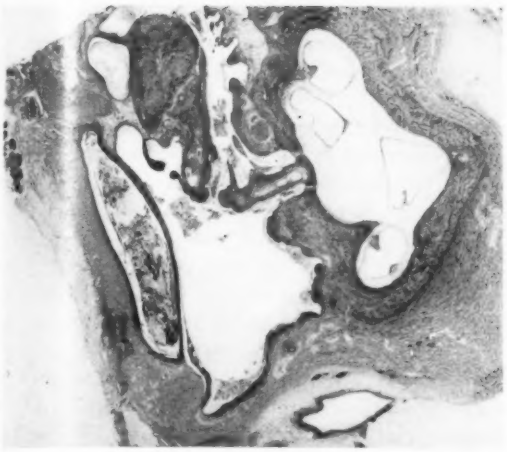

FIGURE 2. A histologic section of a middle ear, showing adhesions and scars in the epitympanum. Similar cases are now surgically treated by removing the adhesions under a microscope (tympanoplasty).

inner ear and especially its nerve (also shown in figure 1) are functioning well. This is similar to the condition required for cataract surgery, in which it must be determined that the retina and the optic nerve are functioning. Accepted by nearly all otologists, fenestration is successful in many cases and has been a standard procedure for nearly 15 years.

More recently, Rosen suggested a different approach to the stapes fixation caused by otosclerosis. Going through the outer ear canal without any outside incision, he lifts the eardrum and exposes the oval window area and the incudostapedial articulation. With a fine hooklike instrument called the mobilizer, he then breaks the otosclerotic adhesions.

A successful mobilization has many advantages over fenestration. It is a much shorter operation, with considerably less postsurgical unpleasantness for the patient. It does not cause as much dizziness as does a fenestration; the patient can go home within 36 hours, and he may regain normal hearing. With increasing experience, the percentage of successful operations of this type is increasing.

Before the final test of surgery by mobilization, a new type of operation, resulting particularly from the work of Wullstein and Zoellner, was introduced from Germany. This is called the tympanoplastic operation, and it is directed toward improving the hearing of patients who have had inflammatory middle ear disease. It is a combination of the eradication of inflammatory activity and the plastic build-

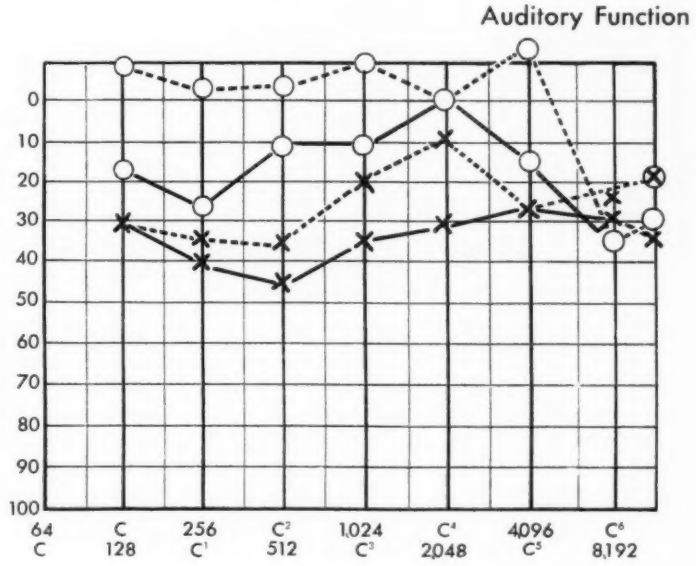

FIGURE 3. Audiogram of a patient treated with artificial eardrums. Hearing gain of up to 30 db in some frequencies is obtained by placing rubber membranes over the eardrum perforations. The solid line indicates hearing before treatment; the broken line, after treatment. The circles indicate the right ear and the Xs, the left ear.

up of the destroyed or partially destroyed middle ear. An attempt is made to overcome the permanent defect of a perforation by means of a plastic flap. A skin flap taken from behind the ear is put over the perforation as a free transplant. A surprisingly large number of free transplants are successful. If and when a perforation is closed permanently by this type of a free transplant, the patient is helped in various ways: He can hear better; he is not limited in activities such as swimming, since he no longer has a permanent perforation; and the likelihood of a recurrence of ear discharge is diminished.

Tympanoplastic surgery has proceeded still further. In case of extensive pathologic findings in the epitympanum or in the window area, scars and adhesions can be removed with fine instruments under the microscope (figure 2). If the ossicles are destroyed, an ossicular chain can be substituted by placing a straight rod between ear drum and stapes in the middle ear. Such a plastic rod is called a columella. It may consist of either bone, cartilage or plastic material. The name columella is derived from the anatomy of the bird's ear. Birds do not possess an ossicular chain of three little bones as do humans. They have only one straight rod, which zoologists call the columella. Accordingly, the procedure of replacing the ossicular chain with a straight rod is called columellization.

The hearing improvements due to columella inserts are great. We do not know too much about the permanency of the results, because this kind of surgery is too new. We are now trying to use metallic wire for a columella. Sometimes, it is possible to place the eardrum directly over the head of the stapes. If this is done surgically, hearing improves and no columella insert is necessary. This operation is called a myringostapedopexie.

It is important for the otologist to know if the windows of the middle ear are moving freely; this can be ascertained by making tests for motility before surgery is performed. If the windows are not mobile, adhesions or calcareous plaques can be removed from the niche of the oval window. Patients who have had such an operation sometimes have shown good improvement.

It must be mentioned that in addition to the tympanoplastic operation, there is the possibility of using artificial middle ear devices, which are called prostheses. When they are placed properly in the middle ear, these very small gadgets can improve hearing to an astonishingly large degree. Figure 3 illustrates the auditory function of a patient who was fitted with an artificial eardrum in each ear. If this device is adapted to the needs of the individual patient, the hearing gains obtainable are indeed promising.

Although I do not recommend that the general practitioner should actually place prosthetic devices in the middle ear, it is important for him to know of their possibilities, so he can advise his patients accordingly.

The Use of a Long Tube in Bowel Obstruction: Indications and Technic

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MORTALITY from intestinal obstruction has decreased in the last decade owing mainly to a better understanding of fluid and electrolyte balance and the use of a long tube for preoperative decompression. It is our purpose to outline some of the basic principles in the conservative management of an intestinal obstruction.

About 80 per cent of intestinal obstructions occur in the small bowel and about 20 per cent in the colon. The first requirement when a patient shows signs of intestinal obstruction is a scout film (preliminary survey roentgenogram) of the abdomen, taken with the patient in an upright position if possible. The roentgenogram will show whether the obstruction is located in the small or large bowel (figure 1a and b), the degree of obstruction, and sometimes the cause (figures 2 and 3).

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Indications and Contraindications

Obstruction of the large bowel—Obstruction limited to the large bowel does not respond to use of a long tube when the ileocecal valve is competent (figure 4a). However, when the valve is incompetent and when there is accompanying dilatation of the small bowel, the long tube may decrease the total amount of entrapped gas and prevent progression of the colonic distention.

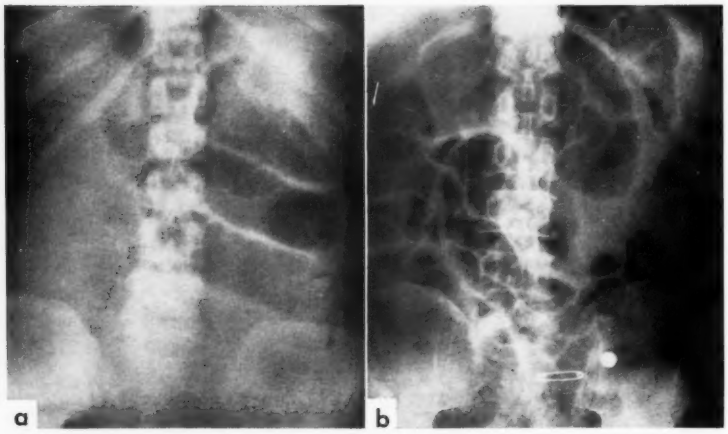

FIGURE 1a. Obstruction of small bowel. b. Obstruction of large bowel. The colon is distended except in its lower portion. The obstructing lesion must be in the descending colon.

Obstruction of the small bowel—This usually responds well to the use of a long tube. The higher the obstruction, the faster relief is obtained. Surgical treatment can be delayed with safety if a well-functioning tube has been passed and is in place. This delay allows replacement of fluids and electrolytes, and the time to effect partial or complete decompression. The surgical procedure then can be accomplished under much better conditions with

FIGURE 2. Obstruction of the small bowel from a gallstone seen on the roentgenogram. Air is shown also in the biliary tract. There were no previous symptoms referable to the gastrointestinal tract. After a few days of conservative treatment blood urea went down from 142 mg. per 100 cc. at the time of admission to 48 mg. at the time of operation.

FIGURE 3. Obstruction caused by fecal impaction in the right part of the colon. The patient was referred because of abdominal distention and the presence of a mass in the right flank.

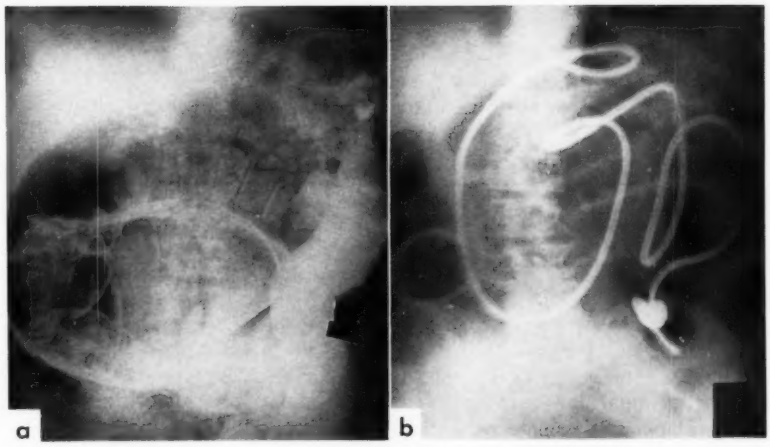

FIGURE 4a. Closed-loop obstruction of the large bowel due to the competency of the ileocecal valve. The obstruction must be in the rectosigmoid. b. Obstruction in small bowel developing four days after a low anterior resection for carcinoma of the upper part of rectum. This patient had a long tube in for 10 days, at the end of which time the values for carbon dioxide were 23 mEq. per liter of plasma, for chlorides 101 mEq., for potassium 4.4 mEq. per liter of serum, and for urea 24 mg. per 100 cc. of blood.

significantly lower operative morbidity and mortality.

A few patients with incomplete or recurrent simple mechanical obstruction may be completely relieved by intubation so that surgical intervention may be avoided.

The majority of obstructions of the small bowel that occur within one month after operation can be relieved by the use of a long tube. Surgeons are most desirous of avoiding further surgical intervention, unless necessary, on patients who are recovering from a recent operation (figure 4b).

Strangulation—Strangulation or serious hazard to intestinal circulation is an indication for immediate surgical intervention if the patient can possibly tolerate the procedure. In the presence of strangulation, the bowel may perforate in the time spent in attempting to pass a tube through the pylorus. However, a few minutes spent in placing a tube to empty the stomach may prevent regurgitation during anesthesia, and the balloon may be milked into the intestine at operation.

If, during conservative management of mechanical obstruction, signs of strangulation appear, such as a rise in pulse rate, temperature and leukocyte count, abdominal rigidity or rebound tenderness, immediate operation is indicated. When the bowel is strangulated, cramps occur more frequently and are more painful than when no strangulation exists and there is no interval of complete relief of pain. The differentiation between simple mechanical obstruction and obstruction with strangulation is sometimes difficult.

Paralytic ileus—This is best treated by nonsurgical measures (figure 5). A long tube may pass into the duodenum easily, but its progress

FIGURE 5. Paralytic ileus from fracture of the left hip.

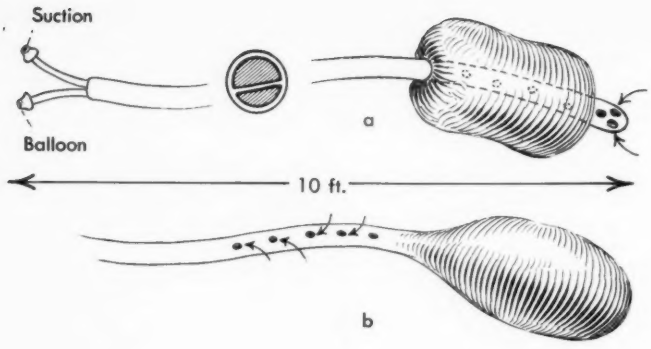

FIGURE 6. The tubes. a. The Miller-Abbott tube is a double-lumen tube; the larger lumen is used to aspirate, the smaller one to inflate the balloon. Such tubes may vary in size from 12 to 18 F. b. The Cantor tube is a single-lumen rubber tube. It may afford more efficient decompression than the Miller-Abbott tube because its lumen is larger. Its length is 10 ft. like the Miller-Abbott tube.

in the small bowel is hindered by the lack of peristalsis. In this circumstance, a vagotonic drug such as neostigmine (PROSTIGMIN®) given in divided doses may help the progression of the tube. Such a drug should not be given in the presence of mechanical obstruction.

Supportive Measures

The patient with intestinal obstruction requires a large quantity of fluids. According to his output, daily intravenous infusions of 4000 to 8000 cc. of solutions which may contain 9 to 13 gm. of sodium chloride may be administered in an effort to replace losses and furnish the patient with his daily requirement.

Technic

Most of our experience with the double-lumen Miller-Abbott tube (figure 6a) has been satisfying. Our experience with the various single-lumen tubes (figure 6b) has been more limited. It has been suggested that the larger luminal diameter of these latter tubes permits more efficient decompression.

The balloon and the end of the tube are generously lubricated with a lubricant containing a local analgesic and the tip is introduced through the larger nasal cavity for a distance of 4 in. (or the distance from nostril to tragus). The patient is then instructed to take a sip of water and, as he swallows, the tube is gently pushed so that the tip passes into the oropharynx and follows the bolus of water into the esophagus. This process is repeated until it is thought that the tube is in the stomach. It is then important to aspirate some of the gastric contents through the tube to make sure that its end is in the stomach.

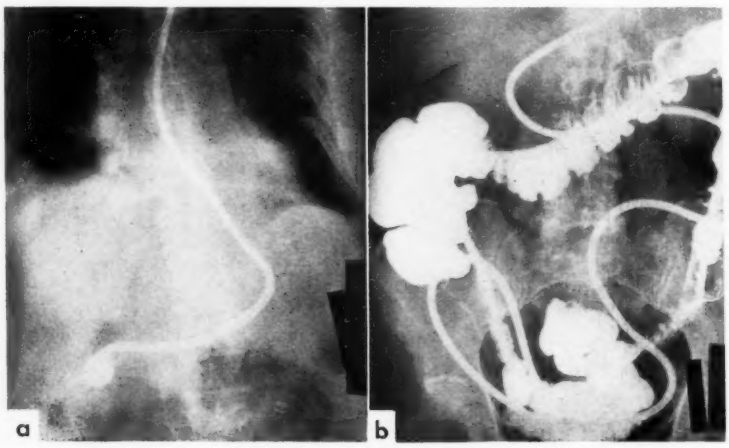

FIGURE 7a. The tip of the tube is in the first portion of the duodenum. Thirty cubic centimeters of water is now put into the balloon and the patient is permitted to be in any position. b. The tip of the tube is low in the descending colon. As soon as it appears at the rectum, it is cut at the nose and pulled out from below.

When we are certain that the tube is in the stomach, we force 50 cc. of air into the tube to distend the balloon. The tube is pulled back gently and the distended balloon will be stopped at the cardia of the stomach. A marker is placed on the tube at the nostril. The air is then completely withdrawn from the balloon and is replaced by 3 cc. of mercury. An aseptic type of syringe, without its piston, is introduced into the tube that is connected with the balloon and the mercury is poured directly into it.

The patient is turned 90 degrees from prone position onto his right side and the head of the bed is elevated 20 degrees. This position should be strictly maintained. The tube is advanced 1 in. every half hour; this is accomplished by swallowing movements made by the patient. Continuous suction of 90 to 120 mm. of mercury is maintained with an appropriate apparatus attached to the "suction" tip. The tube is irrigated with 1 to 2 oz. (30 to 60 cc.) of water every two hours through the suction tip *only*!

A scout film is taken in three to four hours at which time, as a rule, the tube will have entered the duodenum (figure 7a). If the balloon has not entered the duodenum, the tube is withdrawn to the cardia, the technic described is repeated, and another roentgenogram is made in four hours. When the tip of the tube is shown by the roentgenogram to be in the duodenum, a small amount of air or water (30 cc.) is put into the balloon. The patient then is permitted to be in any position he chooses. Subsequently, the tube is advanced 2 in. every hour. Suction and irrigations are continued.

A scout film is taken daily to show the progression of the tube and the amount and location of intestinal gas. The tube is advanced as long as there is air in the small bowel. Particular attention should be paid to the amount of air in the balloon because migration of intestinal air through the rubber membrane may inflate the balloon sufficiently to rupture it or actually create mechanical obstruction. If this possibility is watched for, and precautions are taken, one need have little fear of necrosis of the intestinal wall.

After two or three days of conservative management, if no more distention of small bowel is noted in the film, the air or water is withdrawn from the balloon; the tube is clamped and the patient is given sips of water (1 oz. every hour). If, at the end of 24 hours, the patient is not nauseated, his abdomen is not distended and he is passing flatus, the tube may be removed.

Occasionally the tube appears at the rectum (figure 7b). When this occurs, it should be cut at the nose and pulled out gradually from below.

The important points in the technic are: (1) to start the tube at a constant point (the gastric cardia) and not try to push it blindly through the pylorus; (2) to advance the tube in a planned fashion, and (3) to keep the patient lying on his right side with the head of the bed elevated.

If the patient turns on his back even for a few minutes before the tube is well into the duodenum, the tip of the tube already engaged through the pylorus may fall back into the stomach and further advancement of the tube will result in its coiling in the stomach.

The patient who has a long tube in the intestinal tract requires constant attention. The physician personally should see him several times a day (1) to check his position in bed; (2) to make sure that proper suction is being maintained, and that the tube is advancing and is being irrigated regularly; (3) to see whether the tube has coiled in the throat or in the stomach; (4) to make certain the balloon end of the tube has not been irrigated by mistake; (5) to find out whether distention of the abdomen has decreased or increased; whether there is any tenderness, or whether the patient is passing any gas through the rectum; (6) to compare the latest abdominal roentgenogram with the previous one, and (7) to balance the input and output of fluids and electrolytes and to make sure the intravenous needle is working properly 24 hours a day.

The success obtained with the use of a long tube in treating a patient with intestinal obstruction is proportional to the amount of time spent with him.

SYMPOSIUM

Current Problems in Child Adoption

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ETHEL VERRY‡ AND URSULA M. GALLAGHER§

General Considerations (Dr. Stevenson)

THE mere mention of child adoption always evokes a warm emotion and a feeling of thankfulness in all parents of adopted children. In fact, nearly everyone has some interest in child adoption. The real concern in this procedure today is in those cases in which the adoption is not arranged through an authorized agency. Since each individual in our society has dignity and worth, the purpose of all our efforts toward protecting children in adoption is to insure for each child the best possible opportunity to fulfill his greatest potentialities as a human being.

In considering the child, we first must determine the basic needs for healthy personality development in all children, and then strive to attain them for the special group of adopted children. We have learned much about the significance of the effect of an infant's early life experiences on later personality development. Depriving an infant of his mother or of *a* mother often has unfortunate effects on his subsequent personality development. Adoption practices can be carried out so as to provide opportunities for the early adoption of infants, thus allowing the establishment of a satisfactory primary relationship between the infant and a mother; however, some adoptive practices actually may interfere with the development of such a relationship. A *primary* sense of trust develops more readily in a child who is comfortably cared for by a competent mother. This is of great importance, since it is from this sense of trust that a feeling of security or comfort in relation to people begins to develop in the infant. Some dependable continuity in the life of the infant or young child is important; it is the basis of a primary and continuing good relationship between the child and the mother. Children who are significantly deprived of this relationship at an early age have a greater tendency to become unduly dependent, to behave frequently in an antisocial way, or to have some kind of incapacitating emotional disorder.

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Each year in the United States, about 170,000 mothers (64,000 white and 106,000 nonwhite) give birth to children out of wedlock. Seventy-two thousand of these women are less than 20 years of age; 42,000 of the children adopted by nonrelatives are born of unmarried mothers; the greater proportion of these are white children.

It is important that every physician become familiar with certain basic aspects of the adoption problem, since he may at some time become involved in an adoption procedure. The most important of these aspects are (1) the protection of the child, the natural parents and the adoptive parents; (2) the complete knowledge of all available community resources by all those giving advice or supervision, or both; (3) the prompt handling of the immediate needs of the unmarried expectant mother, in order that she may arrive at an acceptable solution to her dilemma (this includes medical care, maintenance and financial support, and understanding and help regarding her feelings and reactions); and (4) the provision of medical, legal and social advice for all parties concerned.

It is also important for all physicians to remember that in adoption practices the agencies involved may be: public welfare agencies (local or national, or both); voluntary or private adoption agencies; maternity homes; public health departments; judges of the juvenile or probate court; law enforcement officials; and lawyers and physicians in private practice. A physician in any locality who contemplates playing a role in an adoption process would do well to learn which of these agencies operates in adoption matters. Only then can he give intelligent advice on either adopting a baby or having a baby adopted.

Laws which apply to child adoption vary somewhat from state to state. In general, they involve the following: (1) petition through the court; (2) voluntary and involuntary termination of parental rights; (3) the mother's relinquishment of the child and of the right to consent to adoption; (4) licensing of child-placing agencies, foster homes and maternity care facilities; and (5) specification of those who may or may not place a child for adoption.

Frequently, childless couples and pregnant women turn to the physician for help. The physician believes that he will be helping the unfortunate woman by taking the baby off her hands and that he will be helping the childless couple by getting them the baby they so desperately desire. This may seem quite all right at first glance, but, in helping his patients, the physician frequently does not consider the *needs of the child*. Too often, the busy physician may not actually know the true picture of the adopting couple. A few doctors and lawyers have readily engaged in procuring babies for childless couples, and have collected large fees for their services; such practices are contrary to medical ethics and are to be decried.

The Role of the Obstetrician in Child Adoption

DR. KING: To some extent, everyone would like to feel omnipotent; the physician, particularly the obstetrician, has more opportunity for this self-indulgence than do most people.

This is especially true in the field of adoption of infants. In every community, there are pregnant unmarried or married women who want to dispose of their babies, and there are always childless couples. The obstetrician-gynecologist thus becomes an amboceptor, as it were, and can act in the behalf of those who wish to adopt a baby as well as those who wish to place a baby for adoption.

In some rural or backward areas, the doctor offers the only means by which an adoption can be arranged; however, this is not true in the larger and more progressive cities. All 48 states now have some kind of child placement and adoption laws, although regrettably, they are not uniform. In the state of Ohio, the statutes state clearly that "it is unlawful for any person . . . not approved and certified by the Department of Public Welfare . . . in any manner (to) become a party to the separation of a child from its parent . . . except through a commitment by the Juvenile Court."

It should be emphasized that doctors almost invariably confuse two independent procedures. One procedure is the *placement* of a child in the care of a family with a view to adoption. The other procedure, usually taking place six months later, is the *technical adoption,* which, unless contested, is a fairly routine action in the probate court. The two procedures are comparable to buying a house and later registering the deed. If the child has been placed illegally, the adoption merely legalizes an illegal act in the interest of the child. Thus, any doctor in Ohio who aids and abets the placement of a child with a view to adoption in other than the prescribed manner has violated the law and is subject to a penalty of three months in jail. The Cincinnati Academy of Medicine has gone even further and has declared that such a placement is an unethical practice of medicine.

In addition to the pressure of social tradition or necessity and to the gratification of giving a baby to a favorite patient who cannot have one, while easing the pain and shame of an unwed mother, the obstetrician also is subject to other pressures—those which appear to make black market practices an easy way out. The young unmarried mother wants to rehabilitate herself promptly and wants her child taken as soon as it is delivered rather than six months later; parents who are willing to adopt a child from the black market will invariably accept the child immediately.

Another pressure on the doctor is that the unmarried mother, usually without resources, does not want to go to the hospital as a charity or ward case; and "in consideration of her obstetric expenses, the unmarried mother, for said consideration to the doctor and hospital in hand duly paid," will surrender her baby permanently.

The childless couple, often having been turned down by legal agencies for valid reasons which they pridefully refuse to accept, also puts great pressure on the obstetrician, appealing not only to the generosity of his heart, but also to his pocketbook. It makes little difference in principle whether the doctor charges his minimum fee for the delivery of an unwed mother who would otherwise go to a free service, or charges a high fee because the adopting couple can afford it or is desperate. His recompense may be no more than prestige, a new circle of patients, or a new source of referrals. No matter how conscientious or devoted to his profession he may be, the obstetrician who gains anything from an adopting couple either directly or indirectly dilutes and adulterates his primary physician's responsibility to the parturient mother.

There are other evils connected with the black market practice, even if the obstetrician does not receive a penny or a bit of recognition as a result of the illegal placement. With a planned, independent adoption, the natural mother is seldom aware of the other courses of action open to her, and often later bitterly regrets the decision which she made under emotional stress. Good social agency practice offers her not only information and counsel, but also ample time to make up her mind.

In Ohio, the anonymity of the parties concerned can be protected only by legal placement through an agency. The independent placement offers ample opportunity for anyone to know the names of everyone involved; this is universally condemned and feared.

For the last 25 years, a common argument

against social agency placement has been that a practicing physician is a far better judge of the qualifications of adoptive parents than is a social worker of tender years who has a fresh diploma from college. However, this is an age of specialized training and sound advances in social science. In addition, few doctors can afford to spend the hours necessary to investigate a couple thoroughly; we rely chiefly on the impressions we gain in a few minutes in our consulting rooms. Many doctors, while either recommending couples glowingly or actually placing babies in their homes, have been very embarrassed to learn for the first time from these young but trained agency investigators of chronic alcoholism, prolonged psychotherapy, previous divorces or illegitimate pregnancies, jail sentences, and even bigamy in some of the couples who seemed so deserving. Too often, a couple recommended by doctors as ideal parents confesses to the social caseworker that they want a baby in the hope of saving their marriage, which is on the rocks. Pity the poor child, and hope that these doctors practice better obstetrics than sociology.

There is also the question of the volume of cases handled. In following the concept that the welfare of the child is of primary importance, the agencies try to find for each child the right family from perhaps 200 well-studied applicants. The obstetrician has perhaps two or three families from which to choose. He gives his patient, who could be the wife of a college professor, the next illegitimate child he delivers, even if the child's mother finally achieved only the sixth grade of school at the age of 15.

In small towns or rural regions where there are no agencies, the physician may of necessity have to be the intermediary for adoption. He must be certain that the mother really wants to give up her child after having received the proper information regarding the procedure and having been given sufficient time to make her decision. For the protection of all concerned, the physician would do well to interpose a foster family between the natural mother and the adopting parents. He should curb the desire of the adopting family to take the baby right from the hospital, as this will give him the opportunity to study the child. A three month delay should make no difference to a couple mature enough to merit a baby. Anonymity of the child must be preserved, and names of the natural and foster parents should never appear on a document available to both parties. This same isolated physician should try to match the baby and the adopting family as to religious, emotional, intellectual and personality backgrounds and should insist that the prospective foster parents retain a lawyer who will competently handle all the legal aspects of the case. Finally, neither the physician nor the hospital should receive any money or other considerations from the adopting couple.

Where certified agencies do exist, the obstetrician must obey the law; he must recognize the limitations of his sociologic knowledge, his time for adequate investigation, and his volume of cases for proper matching of child and family. He must not let his judgment be swayed by his emotions, and he must consider primarily the *welfare of the child* not only at the time of adoption but also 10 and 15 years afterward. No matter how he rationalizes his fees, his prestige or his referrals, he must carefully avoid participation in a black or "gray" market.

Responsibilities of the Child Placement Agency

ETHEL VERRY: Many people today are convinced that the responsibility for the important and increasingly popular activity of child adoption should be assigned by law to both public and private licensed child welfare agencies to assure maximal protection to children and to their natural and adoptive parents.

It is true that some adoptions made through child placement agencies are not always successful, and that some adoptions are arranged by private individuals to the satisfaction of all concerned. Child placement agencies have different policies and procedures. Some agencies are flexible, modern and well run; others are either rigid or very lax in their standards and practices. At present, practically all agencies are doing all the work they possibly can with

the resources available to them. Experience has shown that a good job is being done by accredited child placement agencies and that, as a matter of social policy, child adoption activities eventually should be centralized in each community, with the proper agency assuming responsibility for the procedure.

As mentioned previously, the services of several professions usually are required in the adoption of children. A lawyer should carefully attend to the legal aspects of the surrender of the child, to the adoption proper, and to procuring the necessary records, including the birth certificate for the child. Medical care is a necessity for the natural mother and the newborn baby, and good and sympathetic obstetric care is especially important for the emotionally upset unmarried girl. Sometimes, psychologic testing of the child to be adopted and even of its natural mother is important. Since the situations leading to the surrender of a child for adoption are usually of an involved and emotional nature, the natural mother or parents may well need psychiatric help in arriving at their decision to surrender the child. They also may need further help in living with their decision. Since childlessness and the necessity of seeking a child through adoption are emotionally difficult situations for some couples, there are occasions when adopting parents could also benefit from psychiatric help. For the older child, the transfer of his already-formed close ties from a natural family (however rejecting or neglectful they may have been) to a new family is an experience with which he is sure to need special help from someone who understands a child's emotional reactions. In all of these intermeshed arrangements among various persons, each with his own needs and viewpoint, the help of a social caseworker is essential in order to coordinate the other professional services and to help all of the parties involved to work together.

In addition to the services of the medical, legal, psychiatric, psychologic and social work professions, the people involved in child adoption often need actual material help. A mother—usually unmarried—surrendering her baby may need a place to live and money to pay bills both before and after the baby's birth. The baby must have continuous care from the time it is born, and, since it cannot always go directly from the hospital into a waiting adoptive home, adequate interim care must be available. Throughout this complicated process of adoption, the major need is for *someone to maintain continuing and comprehensive responsibility* for helping the involved parties with their various problems and, particularly, for *watching over and championing the interests and rights of the child involved*. The natural parents often are more concerned with their need and desire to be quickly and quietly free of the responsibility of caring for the child than they are with the child's welfare. Just as often, the adoptive parents may be so absorbed in their own need and desire to have a child for themselves that they cannot objectively consider the best plan for the child in question. The child welfare agency understands and accepts the needs of both sets of parents, but it cannot be swayed from its primary goal—finding the best and most suitable parents for the individual child.

Adoption is not a single decisive act; it is a process which involves several people through a series of decisions, usually over a period of several months. During this time, it is always possible that something will not go according to the original plan. The mother may decide not to give up her baby. The baby may be born with a serious physical or mental defect. The adoptive parents may find out that they either really do not want a baby or do not want this particular baby. Although one link in the process may break, it does not change the needs of the others involved. When things go wrong in the adoption process, there must be someone or some agency that can take care of the needs which thus arise. The natural mother may need help to care and plan for her baby if she decides to keep it. The adoptive parents may still be able to be good parents to some child, but not to this particular one. If the baby is defective, it will need care; this is true even if its own or its prospective adoptive parents do not want it. Because of this complicated, continuing and uncertain nature of the adoption process, it is not safe for

a practitioner of any one of the involved professions—law, medicine, psychiatry, psychology or social service—to assume individual responsibility for child adoption. Only a child-placing agency which has resources for care of the child and mother and in which the various professions can work together according to a formulated plan, with mutual understanding and respect, is capable of assuming the responsibility of adoption.

Child-placing agencies are and should be licensed for the work which they do, and through this process they should maintain high standards. They can and should be controlled by responsible citizens who serve on their advisory or managing boards. Their policies and procedures can and should change as knowledge of the various interests and technics of child adoption increases. Agencies should and usually do have available within their framework flexible resources and the services of the several professions, in order to help the natural mother, to provide the necessary care for the child, and to offer adoptive parents both advice and some selection as to the type of child placed in their home. Agencies are much more amenable to sound social control than are a group of individual practitioners in several professions. The agency also has continuity in a given community; the individual practitioner in any profession may discontinue his practice and leave, but the agency has a continuous existence year after year. A child may come back to the agency to seek information about himself and his background if he wants or needs it; if necessary, the adoptive parents can turn to the agency for continuing help with their adopted child.

Thus, in the child placement agencies, there is an existing machinery which is eminently suitable for providing a good child adoption service to the community; every physician who treats sterile couples unsuccessfully or practices obstetrics, or both, should work closely with these agencies.

URSULA M. GALLAGHER: Adoption is a sound plan for the child whose parents cannot provide a suitable permanent home for him. On the other hand, the family is basic to our society, and no child should be deprived of his natural parents needlessly. It is important, therefore, that social services are available to the parents before permanent separation is effected. The unmarried mother will require medical care, help with emotional conflicts, financial assistance and shelter. She must be considered as an especially needful individual, and help must be available for her as well as for her child. Physicians who practice obstetrics are in a strategic position to point out the services available.

Society has a real responsibility in planning for the child whose parents cannot care for it; thus, it is unsound to base an adoption placement on an agreement between two individuals. All such placements should be the responsibility of agencies which are supported by the community and are licensed or authorized by the welfare department of the state. The shaping of the policies of these agencies should be the responsibility of boards, committees or advisory groups comprised of representative and qualified citizens.

The staff of such an agency should be made up of competent people who have special training in and a knowledge and understanding of the dynamics of human behavior. They should be sensitive to the feelings of a parent who is considering the surrender of all rights to a child; they should understand the needs of the child and have the ability to evaluate the potentials of the adoptive parents; they should be aware of what it means to be childless and yet to assume parenthood; and they should discerningly choose a home that offers opportunity for the child's happiness. The staff should seek the help of the obstetrician, the gynecologist, the pediatrician and the psychiatrist; medical judgments should be made only by members of the medical profession.

An essential safeguard in adoption is legal termination of parental control prior to the child's placement. Responsibility for the child during the period following *placement* (prior to consummation of *legal adoption*) must be fixed with an authorized agent or agency. Some adoptive parents change their minds, are dissatisfied with a particular child, pass the child on to others who may or may not be suitable parents, or never file an adoption petition.

Agencies rather than individuals can adequately follow up to see that a child's best interests are served. While many nonagency adoptions are successful, potential dangers are: (1) return of the mother to reclaim the child, (2) lack of information on the social or legal status of the child, or (3) selection of the wrong home for a particular child. An accredited agency has all the necessary resources to guard against these dangers.

Provision of adequate adoption services has not kept pace with the demand. There is a serious staff shortage in the entire field of social work, and adoption is no exception. Some poor methods in handling adoptive applicants, such as long delays before making an appointment or refusal to meet with them "without a hearing," can be attributed solely to inability to stretch inadequate staff services. Social agencies with good standards are trying to remedy these and other poor practices, but they do not yet have the solution to some of the manifold problems in adoption. However, they have accumulated a body of knowledge based on experience in a field for which they have special training. In any instance where a given social worker does not have the two years of special training beyond the bachelor's degree, as usually required, the supervisor or case consultant of the agency plays an active role in providing adequate supervision and safeguards.

The more progressive agencies are constantly reviewing their policies and are striving to improve them. Earlier placements are being made, since this is most important in promoting the infant's emotional security; the newer concepts of pediatricians and infant behaviorists as to what constitutes a "good-risk infant" are becoming increasingly important. These concepts include questions regarding the prenatal care, the inheritance of or susceptibility to disease, and the mental capacity and emotional stability of the parents; they also include treatment or prognosis of any condition in the infant. Earlier placements must be coordinated with continuing services to the adoptive parents in order to provide opportunity for their making a decision without undue pressure. Emphasis is now being placed on making an all-out effort to recruit homes for older and handicapped children—children who once were not considered for adoption. Some agencies charge fees, but adoptive applicants need not be affluent or have influential status. Sound adoption practice demands of the adoptive parents a stable marriage, good physical and mental health and a true concern for a child.

Greater public understanding is necessary regarding the complexities in adoption and the need for special protection of the child and of the natural and adopting parents. Expansion of services through the provision of additional private and public funds is imperative. Every parentless child who needs and who can adjust to a permanent and stable family must be given the opportunity to do so.

Legal Aspects of Child Adoption

Quoting from Elson and Elson:[1]

> Recent publicity about black market traffic in babies gives prominent place to unscrupulous lawyers out for a high fee. These lawyers conduct a cash-and-carry practice in the placement of babies and are oblivious to the tragic consequences of their work. In the public mind, they bring disrepute to the lawyer's role in adoption. They obscure the very positive force which lawyers and judges, individually and through local bar associations, exert in improving state adoption laws and in strengthening the work of the social agencies in their communities. Apart from the lawyer who participates in the black market, there is a far larger group of lawyers who, with the best of motives, participate in independent placement of children. It is important, therefore, not only to understand the responsibility of the legal profession and its area of competence in adoption, but to understand also the role of the social agency in the adoption process. *Adoption is a creation of the legal* process. It involves unequivocal and irrevocable adjustment of legal relation with profound and permanent implications for natural parents, adopting parents, child and society.

What are the responsibilities of the lawyer in child adoption matters? His first duty is to the clients who consult him regarding their desire to adopt a child. He must describe to them "the legal consequences of adoption, ir-

revocable in all but a few jurisdictions: that the child becomes the child of his clients *as if born to them naturally*, that the obligation to nurture and support the child, and the child's right to inherit, follow from this. He explains that (by the legal adoption process) *all rights of the natural parents are completely severed*, describes the inheritance rights of the adopted child, and details the requirements of the relevant adoption statute."[1]

Although the provisions of the adoption statutes of each state vary greatly, all require either some form of consent from the natural parents or a court determination that they are unfit parents, with the subsequent requirement that consent to adoption be vested in a guardian *ad litem* or other appointed agency. All require reasonable evidence that adoption by the prospective foster parents is for the best interests of the child. Many states set an age limit for adopting couples, which usually is 35 or 40 years of age for both husband and wife; many also "have written into their adoption statute a requirement that children be placed within the broad religious classification into which they were born. Complying with this requirement, sectarian agencies place children with families who represent their denomination. Nonsectarian agencies must find families whose general characteristics, including religion, harmonize with those of the children"[2] they are ready to place. Fortunately, more and more states are including provisions in their statutes which require licensing of child placement agencies, which set forth the operational standards for such agencies, and which forbid lawyers, physicians and other individuals to engage in child placement activities. Thus it is the lawyer's professional duty to describe to his clients the available services of local child placement agencies, and to encourage them to consult these agencies and to rely on the advice and guidance received. In working with these agencies, the lawyer should make certain that all of the legal requirements of the adoption statute have been met and that the decree will be unassailable; in turn, the agencies should rely completely on their attorney for guidance in all legal aspects of adoption.

Summary

1. Child *adoption* is the legal process by which the child of one set of parents becomes the child of other parents; it confers on the child and the adoptive parents substantially the same mutual rights and responsibilities as those which exist in the natural parent-child relationship. Child *placement* consists of placing the infant in the home of proper foster parents where it will receive adequate mothering care for that period which precedes actual consummation of adoption.

2. Because of the legal, social, medical and psychologic considerations in adoption, representatives of the law, medicine and social agencies should work together in harmony.

3. The first goal of all adoption practices is to serve the best interests of the child, and, secondly, to fulfill the needs of the natural and adoptive parents.

4. Adoption procedures are governed by state laws and must be carried out in strict conformity to them.

5. In general, it is best for the infant to be placed as early as possible, since this establishes a satisfactory primary relationship with an adequate mothering woman; only rarely is it necessary to terminate this relationship. Early placement is possible in the case of some infants when there is a full family history, when the mothers have had a normal pregnancy and delivery, and when the infant, in the considered judgment of a competent physician, is normal and healthy in every way.

6. Child placement agencies are constantly reviewing and improving their policies; they are striving for more efficient and rapid handling of cases and for earlier placement of the infants when possible. They will be able to improve and expand their services when additional private and public funds are available.

7. It is suggested that every state medical society periodically publish a list of available child adoption agencies in its state.

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1. Elson, A. and Elson, M.: Lawyers and adoption: The lawyer's responsibility in perspective. J. Am. Bar A. 41:1125-1128 (December) 1955.
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SYMPOSIUM

Trauma

HENRY G. SCHWARTZ,[1] C. ROLLINS HANLON,[2]
JAMES K. STACK[3] AND WAYNE B. SLAUGHTER[4]

Treatment of Head Injuries (Dr. Henry G. Schwartz)

In the short time allotted, I can only touch on the high lights of treatment of head injuries and present a few examples of probably the most traumatic situations. First I want to emphasize that in a head injury it is primarily the damage to the brain that should concern us rather than a skull fracture itself. Let us say that a patient with a head injury is brought in unconscious. He is trailed by family or friends who are extremely anxious about his condition. He is taken to the x-ray room after surviving the trials of passing through the admitting office. X-rays reveal a rather extensive fracture of the frontal bone. This is reported to the family or friends, who immediately start selecting an undertaker. While you try to dissuade them, the patient awakens and demands some food. There is little actual brain damage.

Some skull fractures do demand surgical intervention, and they account for some of the drama and awe surrounding any head injury. If we classify head injury as related to the skull, we come up with a working division of (1) closed head injuries with and without fracture and (2) open or compound fractures of the skull.

Treatment of a skull fracture itself is limited to relatively few instances. One of our youngest patients was a newborn baby who had been delivered by forceps. The obstetrician assured me that the infant could not possibly have a skull fracture and that the concavity on the side of the head was simply due to a false hematoma. X-rays showed that this hematoma seemed somewhat greater than was anticipated, with marked depression of the parietal bone. Obviously such an extensive depressed fragment causing general pressure must be elevated, and in a very young patient this can be done easily by making a small incision adjacent to the fracture line, inserting a curved instrument, and elevating or moulding the depression.

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Presented before the forty-second annual Assembly of the Interstate Postgraduate Medical Association at Chicago.

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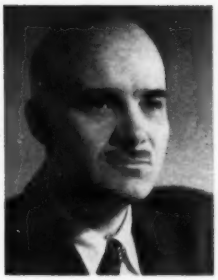
C. ROLLINS HANLON



JAMES K. STACK

WAYNE B. SLAUGHTER

I cannot help thinking, when I mention this patient, of what happened about two weeks later. The maternity department called and said that a nurse had dropped a baby on the floor and there was a "ping-pong" fracture of the skull. Our resident went over to see it and frantically ordered the operating room prepared. Just before the baby's head was to be shaved and prepared, he let out a terrific howl, increasing the intracranial pressure; one could almost hear the pop of spontaneous expansion of the fracture, which obviated surgery.

Fractures which overlie important areas of the brain deserve special treatment. Figure 1 represents such a case. The patient had a comminuted depressed fracture in the parietal region of the skull, overlying the motor strip. We are particularly concerned about damage to the motor area because of the possibility of subsequent epilepsy. If a fracture of this type were around the right posterior parietal region or over either anterior frontal region, I do not think we would be concerned about the importance of elevating it. However, a fracture overlying the motor strip could result in an extremely dense scar which might subsequently cause epilepsy. Accordingly, operation definitely is indicated.

When the scalp was reflected, the comminuted depressed fragment was visible (figure 2). The fragment was elevated, and a tiny opening in the outer layer only of the dura was noted. We have learned that underneath such fractures one may find considerable contusion of the brain, or hematomas, and that if left alone they will result in extensive scarring, far greater than any surgical scar, and thus increase the incidence of epilepsy. The dura was opened widely. Pushing out from the surface of the cortex was seen a little dark tissue that was obviously the surface of a clot (figure 3). Retractors were inserted, and a subcortical clot was evacuated under direct vision. We feel that by this procedure we changed an extensive cerebral cicatrix, resulting from fibroblastic proliferation into this huge hematoma, to a slender glial line scar which is far less likely to cause epilepsy. After the hematoma was removed the dura was closed completely (figure 4), and this was followed by closure of the rest of the wound.

Another category of skull injury that deserves consideration is compound fracture. A compound fracture of the skull demands treatment primarily to prevent infection and secondarily to restore anatomic and physiologic continuity, just as a compound fracture anyplace else in the body does. The communication between the brain and the outside should be sealed off to prevent brain abscess or meningitis. I say this very strongly, despite the availability of antibiotics and other drugs.

Debridement of a compound head wound consists of limited excision of skin margins and removal of all loose and particularly in-driven bone fragments. Under direct vision, clot and pulpefied brain are evacuated with suction. Incomplete debridement, especially leaving behind in-driven bone fragments, is to be condemned. If the general condition of the patient is not good enough to permit definitive surgical treatment, it is wiser to defer operation until the situation is more propitious. After careful debridement and hemo-

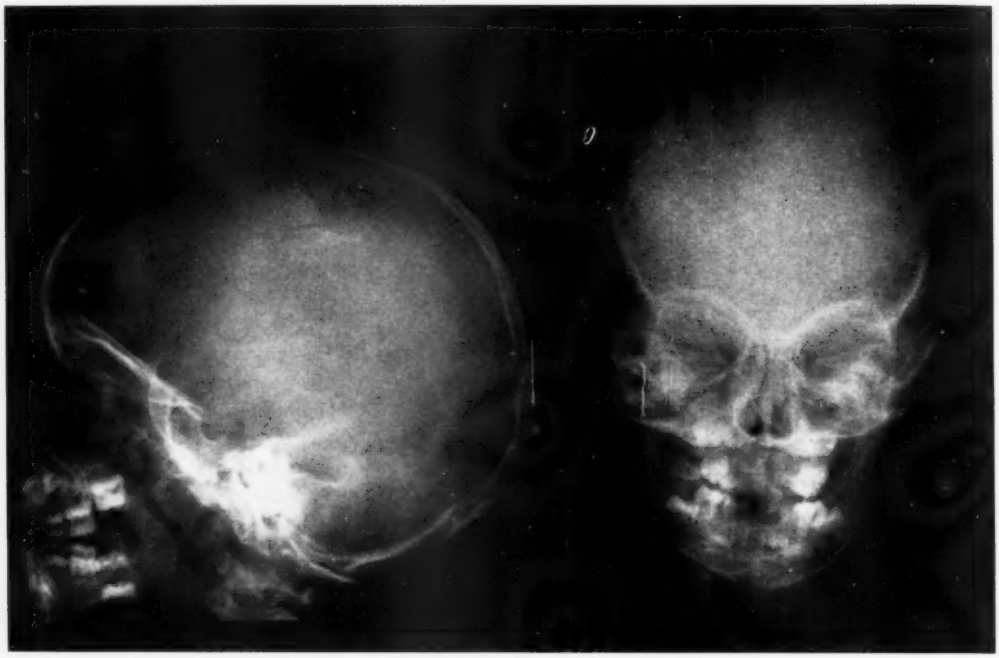


FIGURE 1. Comminuted depressed fracture in parietal region overlying the motor strip.

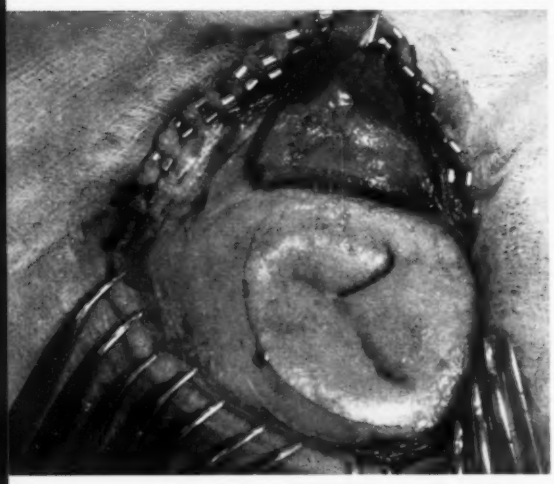


FIGURE 2. Depressed fragment is seen when the scalp is reflected.

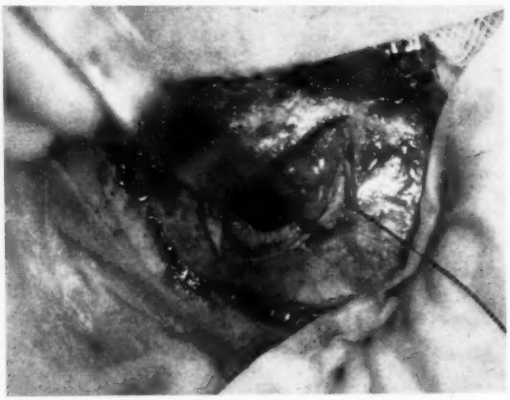


FIGURE 3. On opening the dura widely, dark tissue, obviously the surface of a clot, is seen protruding from the surface of the cortex.

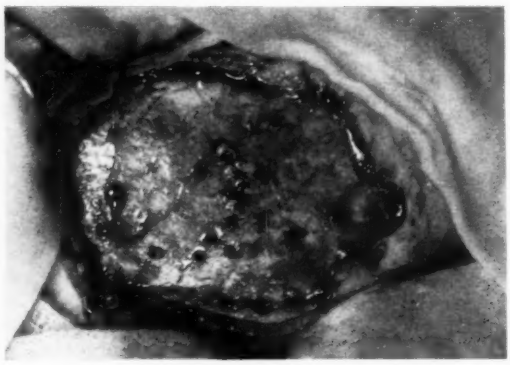


FIGURE 4. After removal of the hematoma, the dura is closed completely.

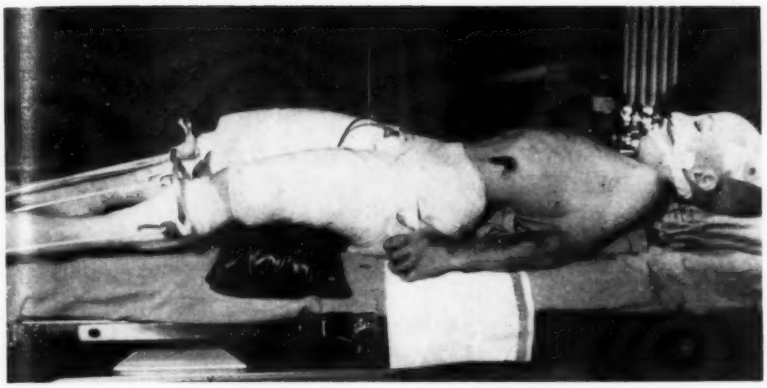


FIGURE 5. This boy was hit by an automobile while riding his bicycle. In addition to an extensive skull fracture, he had fractures of both femurs, a burn of the left arm, subcutaneous emphysema of the thoracic wall, and penial laceration.

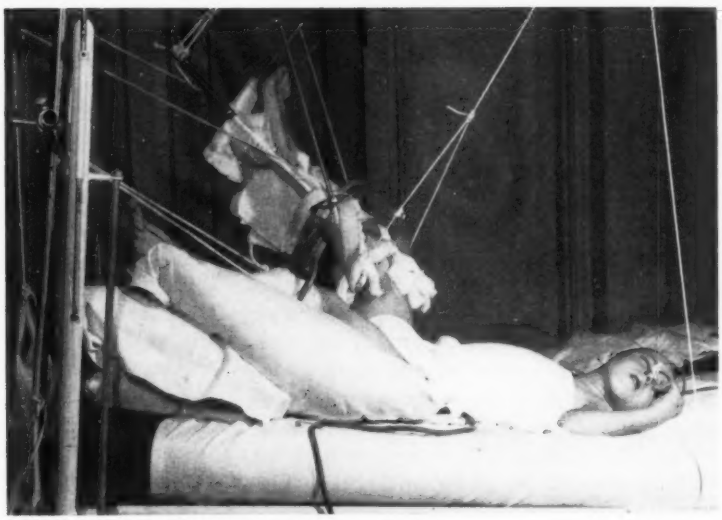


FIGURE 6. Patient in traction for the femoral fractures.

stasis, the dura and scalp are closed with interrupted silk sutures. Cosmetic defects in the skull can be corrected several months later.

The boy shown in figures 5 and 6 was brought in after a head injury. He had been hit by an automobile while on his bicycle. There was an extensive fracture of the skull involving the parietal and occipital bones. In addition, he was in shock. He had fractures of both femurs, a burn of the left arm, subcutaneous emphysema of the thoracic wall, and laceration of the penis. This case represents an instance when it is imperative to treat the whole patient and not one tiny little segment.

The shock was treated first. Pins were then placed in the tibias and traction was exerted against the femurs to improve the shocklike condition and prevent, if possible, fat embolism. Subsequently the burned area of the arm was cleaned and dressed. The compound skull fracture was left alone for the time being. We have found that it is not essential to do complete debridement of a compound fracture if the patient's condition is not satisfactory; in due time, after shock and other injuries have been treated, one can take care of the fracture.

The following day the boy was brought to the operating room and we carried out debridement of the compound fracture of the skull. The photograph in figure 5 was made at that time. Figure 6 shows him a week or two later, in counterbalanced traction for the fractures of the femurs. The penetrating wound in the chest was taken care of, as were the burn on the left arm and the compound fracture of the skull.

Crushing Injuries of the Chest (Dr. C. Rollins Hanlon)

The general principles of chest injuries embrace two major aspects, respiratory and cardiovascular. The respiratory problems are more important. They fall naturally into those that concern the airway, which is the most gross aspect of respiratory function, and those that concern the finer pulmonary divisions. Interference with the airway may be caused by foreign bodies in the trachea, by blood or secretions, and by severance of the trachea intrathoracically, even in blunt injuries (I am speaking now only of crushing or nonpenetrating injuries of the chest). Similar forces operating on a major bronchus also may interfere with the airway, or there may be interference with respiratory function in the parenchymal zone with hemorrhage into the lung substance itself, as in the classic wet lung resulting from blast injury or contusion of the chest, sometimes occurring without obvious bony fracture.

Air, blood or other fluids in the chest can interfere with respiratory function. When we speak of pneumothorax we refer particularly to *progressive* tension pneumothorax, because mere presence of air under some tension does not have the same serious prognosis as does a progressive increase in the amount of air with tension increasing. When either tension pneumothorax or hemothorax compromises the breathing space, it is dangerous. Combination of the two complicates the problem, and there are many varieties of interference with respiratory function by air, by blood, or by both. The interference may be internal replacement of ventilatory space or external compression.

These are not all the pulmonary conditions causing respiratory embarrassment, but hurrying on to the cardiovascular ones the first that comes to mind is simple bleeding. This bleeding can occur from the chest wall, as from an intercostal vessel or internal mammary artery; it can occur from a pulmonary artery or vein; it can occur from the aorta itself. Usually what happens in a blunt injury to the chest, as far as the aorta is concerned, is that an aneurysm develops later just beyond the subclavian artery.

Other interferences with the cardiovascular apparatus include direct damage to the heart itself. This can be a contusion resulting in ventricular fibrillation or in a late complication such as aneurysm of the ventricle, which is rare. More common is cardiac tamponade due to pericardial effusion of bloody fluid, and this, while uncommon in blunt trauma, has to be watched for because it may explain shock in the absence of demonstrable gross external loss of blood.

This recital of various things that can affect the economy after trauma to the chest is extremely sketchy. I might mention certain specific entities and in general how one treats them. First let us consider hemothorax. One treats that by aspirating, and if aspiration is successful but the condition recurs one has to aspirate again. If it recurs again one has to put in a drainage tube or, in some instances, if the bleeding is alarming, do a thoracotomy. I would like to stress that before performing thoracotomy because of continued bleeding one has to be positive that the bleeding is continuing, and I will point out later how one can be confused about this.

In pneumothorax, one can tell about tension pneumothorax by measuring the pressure or, if a pressure-measuring device is not available, by aspirating 1000 or 2000 cc. of air and waiting a little while. If difficulty recurs or if aspiration again yields the same amount, obviously there is a major bronchial leak. In this situation one must at least provide constant drainage of air through a water-sealed suction apparatus.

Cardiac tamponade, I believe, is best treated by aspiration. There are surgeons who believe that either sharp wounds or blunt in-

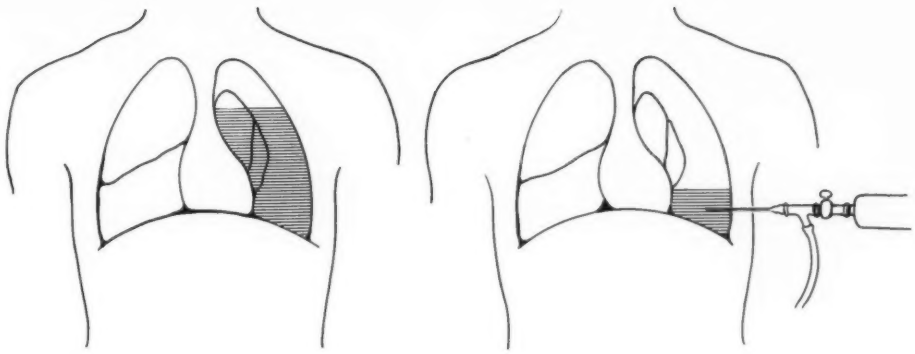


FIGURE 1. Diagram of hemopneumothorax with collapse of left lung. After aspiration, with lung still collapsed, the level of fluid is lower.

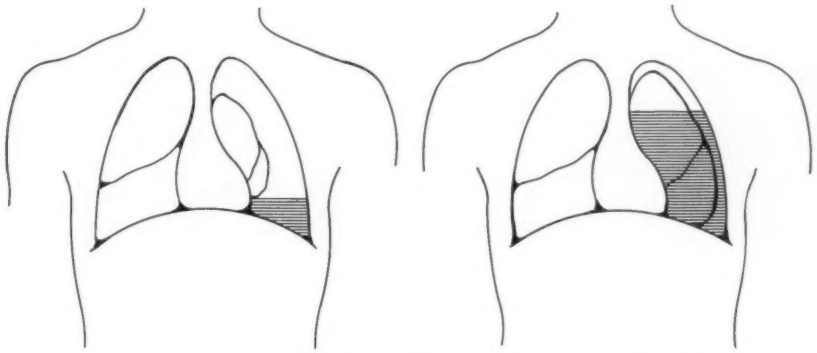


FIGURE 2. Diagram demonstrating how expansion of lung with relatively small amount of blood in pleural space may give the appearance of an increase of blood, leading to incorrect diagnosis of continued bleeding.

juries that cause cardiac tamponade require operation. I have not adhered to that school of thought recently, although I was early trained that open operation was the proper approach. I now believe that one can aspirate the blood in a cardiac tamponade to relieve it as effectively as, and in most instances more safely than, with open thoracotomy. Naclerio and others recently have advocated the open approach on the basis of their substantial experience, and there is no doubt that some patients require open operation. However, we feel that aspiration, if the preparations for open operation have been made (and this is essential), will result in more survivals than will the immediate performance of thoracotomy in every case of cardiac tamponade.

In general, then, when one sees a patient with injury to the chest, the important thing is to make sure he is not going to die—that is, assess his general condition from the standpoint of collateral injuries, from the standpoint of the thoracic injury that threatens his life. Only when one is sure that life-endangering situations have been taken care of can one start treating specific conditions such as hemothorax. In thoracic trauma, shock may be the result of collateral injuries—pneumothorax, cardiac tamponade, and so on. The approach varies, depending on the general assessment of the patient.

The diagram on the left in figure 1 shows hemopneumothorax with blood up to the level of the third rib. After aspiration, as shown on

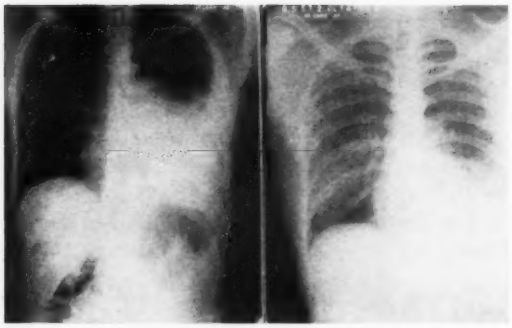


FIGURE 3a *(left)*. Traumatic left hemothorax, initial appearance. b *(right)*. Considerable improvement after single aspiration of blood.

the right, the level is obviously lower, with the lung still collapsed. Keeping in mind this illustration, with the lung collapsed and with the same amount of blood in the chest, if one simply expands the lung (figure 2) the blood will rise to the previous level although no further bleeding has occurred. This is a way in which one can easily be fooled into thinking that bleeding has recurred, and one could be stampeded into unnecessary thoracotomy.

A second point I want to make by means of illustrations has to do with overenthusiastic therapy. Figure 3 shows chest roentgenograms of a young man I saw a few weeks ago. He had a cracked rib with hemothorax but no pneumothorax. When I saw him four days after the injury, his chest had been aspirated, a substantial amount of blood had been removed, and the roentgenogram looked very good, I thought. In an attempt to make him perfect, his physician put in enzymes, streptokinase and streptodornase. Two days later the x-ray appearance was as shown in figure 4a, which is a doubtful tribute to the enzymes. After a few more aspirations on succeeding days, he was back in 10 days almost to the state he had been in on the fifth day (figure 4b). There is a place for enzymes, and it is a valuable place, but in instances such as this the best place is in the original bottle.

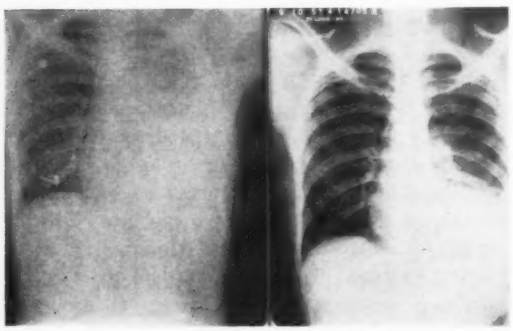


FIGURE 4a *(left)*. Aggravation of fluid after instillation of enzymes. b *(right)*. After repeated aspirations the left pleural space has cleared nearly as well as it had before enzymes were given.

In the roentgenogram in figure 5 you probably cannot see the fractures, but the patient had several fractures of the lower ribs and one transverse process was fractured badly. The patient was injured in an automobile accident. I show this x-ray not because of the fractures but rather to stress the fact that there is pronounced distention of the bowel, contributing to the respiratory difficulty and requiring treatment by indwelling tube to prevent further compromise of the embarrassed respiratory function.

Figure 6 shows a traumatic wet lung on the right. This is not a hemothorax; this is bleeding into the parenchyma, because the mediastinum is shifted to the right. The left lung is greatly hyperexpanded. It is important to insure that the airway is empty of blood and other secretions to permit re-expansion. After a long period of time this lung expanded without any intrathoracic manipulation.

The severe crushing injury of the chest which gives rise to rupture of the diaphragm is illustrated in figure 7a. In some such cases the chest has been aspirated; gastric contents and bowel contents have been removed, at times, under the impression that this is a loculated hydropneumothorax. It is not. Notice that this crushing injury is on the left side, as most of them are. It demands rather early operative attack. Figure 7b was made three weeks after diaphragmatic repair from above. The result is good, with minimal residual difficulty in the chest.

The last case I want to describe should not be included in a discussion of blunt trauma

FIGURE 5. Abdominal roentgenogram to show bowel distention associated with fracture of lower ribs and lumbar transverse processes.

FIGURE 6. Traumatic wet lung on the right side. Distinguished from hemothorax by overexpanded left lung and mediastinal shift to the right.

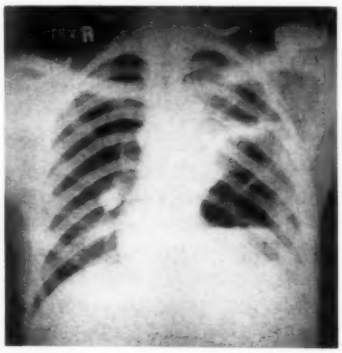


FIGURE 7a *(left)*. Ruptured left diaphragm caused by crushing injury. Air above diaphragm is in bowel loops. b *(right)*. Relatively normal roentgenogram three weeks after transpleural replacement of abdominal viscera and repair of diaphragm.

to the chest because the injury was a penetrating one. However, the patient had been in an automobile accident four years before we saw him, and had had a blunt injury to the chest. A few months before we saw him, he began to have pain in the lower part of the chest. A poorly outlined shadow was seen at the costal margin on the chest roentgenogram, outlined against the gastric air bubble. Thoracotomy was done, and a short, hard cylindrical object was removed. After the fibrin was scraped off, we found it was the gear-shift knob of a 1947 Plymouth. This does not constitute blunt trauma; it constitutes penetrating trauma, and it highlights the fact that, after operation, examination revealed a small linear scar in the region of the costal margin. In addition to emphasizing that one should always do a physical examination, another moral I suppose one can draw, among many, is that in regard to automobiles "they don't make them the way they used to."

The Emergency Room and Injuries of the Extremities (Dr. James K. Stack)

In classifying diseases and injuries, on paper at least, certain conditions are deemed trivial or minor, which is a relative term. Others are deemed important or major, and our students, interns and residents must read about and remember something of these conditions. But in the excitement of the emergency room they find the recognition and separation of one from the other quite different indeed. For instance, a fracture of the tibia perforating the skin of the anterior leg and producing a small wound may seem so

trivial that it will not permit the egress of the hemorrhage inside the leg, which is rapidly developing into a subfascial hematoma whose pressure is threatening the vessels, nerves and muscles in the affected compartment. This same sharp spicule of bone may have pulled back through the same trivial wound a tiny fragment of stocking, a sweat duct or two, a few hairs, all too small to recognize grossly but yet large enough to transplant a few tetanus spores or gas-forming pathogens. A fracture of the femur may seem trivial enough and commonplace, and in the old terminology "simple," but it is not simple to the family of the man who bleeds to death inside his thigh with no evidence of any open wound at all.

It is the teaching aspect of trauma to the extremities and its systemic implications, and the emergency room where the treatment and teaching are conducted, about which I wish to speak. First, let me say that I am extremely proud of the emergency room of our hospital on the edge of downtown Chicago. If conditions permitted, I would certainly want to be brought there after an injury. I am proud of it because it is not considered what one hospital administrator called "an expensive nuisance." We feel that the community in which we live and work has a stake in this emergency room, and we feel that it is a definite and important adjunct to the medical school across the street which entrusts us with junior and senior clerks and interns and many of our resident staff. Many of us live within walking distance and spend a good deal of time there day and night. The resident staff entrusted with the affairs of the emergency room are admonished that consultation at professorial level is always available and must be requested. We feel that the emergency room has a pedagogic role that cannot be matched by any other department in the hospital for certain types of teaching.

The emergency room is the place to start any improvement in the teaching of trauma, and I am sure you are all aware of the impetus such teaching has received in recent years. The appalling increase of mortality and morbidity in civilian accidents demands that we change our attitude toward the emergency room. The teaching of trauma is the highest function of the American Association for the Surgery of Trauma, of which I am Secretary, and it is the highest function of the Committee on Trauma of the American College of Surgeons, a group now in its thirty-fourth year, and I am privileged to be a member. Certain American Boards in the surgical specialties as well as the American Board of Surgery are, in their examinations, insisting on proficiency in this aspect of their specialties, and I might tell you that the Joint Commission for Accreditation of Hospitals will increase its inspection vigilance as far as emergency rooms are concerned, with the thought that the primary care of the injured must be given greater consideration. The Illinois Academy of General Practice had an entire section of its 1956-1957 postgraduate program devoted to the emergency room, all the way from equipment to medicolegal aspects.

The emergency room as a teaching unit has not been utilized to its capacity; actually, litterside teaching can be more effective than bedside teaching because there is a dramatic and urgent element which holds the interest of the students and the house officer group. The only yawning done there is done by the patient in vasovagal or primary neurogenic shock. It offers us a diversion from formal didactic teaching, and it provides, or at least lays the groundwork, for an intimate relationship between student and teacher because they have shared and experienced something that is many times unforgettable as compared with their more prosaic experiences in the classroom. Here in the emergency room the student will see the teacher under pressure, and is more likely to say, when meeting years later, "Do you remember the time . . . ?" or "I'll never forget the man who. . . ."

The call to the emergency room usually stupefies the neophyte, but it is here by the gentle art of leading that he will develop an ability to make decisions. Here he will learn that there is a time for action and a time for inaction, and in moments like these the courses and formalities of his education are far in the background. Where else will he learn the important business of wound priority—the wound

of the open fracture, the wound of the spleen, the open wound of the chest, the unconscious patient, and these may be all in one; where better can you teach that things are not always what they appear to be? Where else can you stress better the false leads and the incomplete totals that are presented by the emergency x-ray?

We may know sometimes at a glance, sometimes after considerable study, that an extremity injury is isolated, innocent and simple as far as management is concerned, but does the house officer know it? He must be taught on the spot the local and systemic problems that arise in a patient. He must be carried through the phase where he understands why pressure splinting, elevation and cold are useful in the management of sprains, undisplaced fractures and contusions of the hands, wrists, ankles and feet. He must know why 48 hours later continued pressure and splinting and elevation, but heat, will hasten absorption of the extravasation which is present but which has been minimized by proper early care. It is here that he learns that casts can be misused, that every fracture does not need a cast. It is unfortunate that the lay public, and many doctors, and most residents consider the presence of a fracture and the need for a cast in the same breath. In their minds, fracture and cast make up a couplet like ham and eggs, Romeo and Juliet, love and marriage, and yet the initiated in the businesses of surgery, cooking, the theater and life in general know that one can exist without the other, and, in fact, do quite well. But you and I are in a position by training and experience to appreciate these things, and I'll not burden you with much on the subject of the care of local extremity wounds except to review briefly the principles that we stress to our students and house staff. These principles have not changed in many years and do deserve emphasis.

Certainly all of us here know that the early care of burned extremities is that of a wound that cannot be closed by primary suture. It can, however, be closed by pressure dressings and later by excision and grafting. Or it can be closed by eschar, which is the principle of the open treatment. It differs from most other wounds in that its systemic effect is characterized by loss of plasma rather than of whole blood, and this is especially true in the early phase and particularly in great second-degree burns. We know that wounds involving tendon and nerve anywhere, but especially in the hand, have a time element. It is the contamination that makes secondary reconstruction many times preferable to primary treatment at all levels except the skin. We should remember the lessons of two world wars that proved by hard experience that primary excision and secondary closure are applicable to many contaminated wounds, wherever in the body they may be.

We know that after substantial damage to arteries below the elbow and the knee, ligation is safe and there will be minimal persistent symptoms, but that above the elbow and the knee, debridement and suture or end to end anastomosis or replacement by graft are preferable to ligation. Ligation here may not necessarily result in gangrene, but it probably will result in symptoms of insufficiency that will be forever troublesome if not disabling.

We know that wounds of bone associated with overlying defects of soft tissue sometimes can be reduced and fixed internally if conditions are right, and if they are not the soft tissues and the contaminant organisms receive priority while the fracture is maintained by traction or other methods that do not enhance the possibility of local infection.

Open wounds of joints deserve special mention because here we are dealing with tissue that does not exist in other extremity injuries, and this element is the articular hyaline cartilage. This tissue is incapable of healing per primam, and the absence of blood vessels within its substance makes it particularly vulnerable to infection. Suppurative infection within a joint can be disastrous to function, and such a complication usually is the result of timidity on the part of the surgeon responsible for the debridement.

Let me quote John Hunter on this subject: "It is from the disposition that the cavities of joints have to fall into suppurative inflammation when an opening is made in them that union by first intention does not take place.

When they suppurate, it is very tedious and the parts are apt to die and slough, which makes these accidents of such dangerous consequence." While the advent of the antibiotics has modified this concept somewhat, it is basically still true and must be remembered. The surgeon must be prepared to sacrifice all contaminated cartilage, knowing that the result, if clean, will be somewhat less than perfect, but knowing also that soiled or devitalized cartilage will not withstand any infection that might follow. Such infection has a great possibility of resulting in the loss of joint function, and many times the loss of the involved limb.

Synovial infection without the presence of foreign material within the joint is another story entirely, and the antibiotics have been a boon to its management; but the antibiotics cannot be depended on to replace cartilage, and they do a poor job in protecting it when contaminated foreign material is driven into its substance. The joint that eventually recovers from infection will never be as good as the one that lost some articular cartilage because of an adequate debridement.

The subjects I have just mentioned can be relatively minor when compared with the massive injuries and combinations of injuries that are also seen in our emergency rooms, and it is with these unfortunate people that we can review with the students the systemic effects of multiple massive open or closed injuries to the extremities and other areas, and stress those factors that give the body the ability to react or prevent it from doing so.

I believe that the management of shock can be taught in the operating room and in the recovery ward, certainly; but I do not believe it can be taught as effectively as it can in the emergency room, particularly in all its aspects. In the operating room and recovery ward the preparation of the patient has resulted in an orderly plan which does not have the spontaneity of the emergency room, and it is this atmosphere of urgency that impresses a student and helps him retain what he hears and sees. The chances are that a student probably will not see vasovagal, neurogenic, or, by its old name, syncope or fainting, or primary shock anywhere in the hospital as he will see it in the emergency room. Here he will recognize the low blood pressure, the cold limbs, the pale lips. He will also note the slow pulse. Here he will appreciate the need for allaying fear, the relief of pain, the necessity for splinting and the watching for signs that this is not mere syncope, that forces other than stress may be in the background and are if, in spite of lowering the head, vasoconstrictive drugs, breathing in of stimulants, etc., the blood pressure remains, let us say, below 100 mm. for 20 minutes. This, of course, is arbitrary. Here he will see that the state of shock of whatever kind is not static, that the patient is not in a state of "suspended animation." He is getting better or he is getting worse. He will see an occasional injured person die in spite of adequate management, and he will be impressed with the best definition of shock that I have found: "progressive hypotensive vasoconstrictive oligemic anoxia." He will remember that the watchword of this definition is "progressive," and in the beginning that is the most important word of this definition for him. He will also realize that in the end death was due to anoxia which, for some reason or another, could not be reversed.

The complaint of many students about didactic teaching is that they have "nothing to hang it on." Let them hang this definition on a coat hanger which is handy. They know what each individual word means, so put it all together on the hanger and show them how it works then and there.

The students have heard about blood and its value; they know that it is a nice thing to have, all seven quarts of it, although some of them will understand this volume better if you transpose it in terms of fifths. They have heard from the Red Cross and have read in the *Reader's Digest* all about the wounded in Korea, many of whom received fantastic amounts of blood, but they did not hear or read about the hundred times as many wounded who had other agents, not so effectively colored and not so dramatically named, such as plasma and its substitutes or expanders, colorless solutions of electrolytes, solutions of sugar, salt, and so on. They should know that blood may not be the panacea that these au-

thors suggest. They must be taught the indications for transfusion so they will not go out and join that great army of the "one unit surgeons."

A patient does not need blood for minimal loss any more than does the donor who has just given 500 cc. of it. The patient needs blood because it is necessary for volume replacement, in other words, he is oligemic, or he needs blood because what he has available does not have sufficient oxygen-carrying power and therefore anoxia is threatened. It should be stressed to the student that the few millimeters of rise in the blood pressure and the few grams of rise in the hemoglobin are transient and ineffectual after one unit of blood has been given. A patient really needs blood or he does not need it; and if he does, one unit is not going to be the answer. *However, he should take the attitude that "when in doubt, transfuse," because there are situations in which the unwary might be trapped.* An example would be a husky young man with obviously severe injuries and an early strong hypertensive response. It should be stressed that one should not wait for the collapse that is bound to come. Restlessness in the absence of pain usually means progressive oligemia, and the combination of severe hemorrhage and burns, where the laboratory findings can mislead because the burn will probably produce a hemoconcentration and the hemorrhage a hemodilution, leading to the possible conclusion that the patient is much better off than he actually is. Clinical judgment is still an important factor in the emergency room, and *this is gained only by being there.*

Other lessons that are best learned in the emergency room are: When is it safe to move the patient? To give him an anesthetic? What kind? To operate on him? How much? Should the operation be a temporary palliative procedure or can it be curative? In other words, when has shock been overcome, or at least stabilized, having in mind the predilection of these patients to again go into it in the operative and immediate postoperative periods? I will admit that much can be learned in the operating room and the recovery ward about the handling of tissue and its response to and recovery from trauma, but there is little opportunity there to learn wound appraisal, and seldom does one have the opportunity there to teach about the *possibilities of contamination with what* and *under what circumstances*; what prophylaxis is required and why. Let us go to the emergency room, see a specific wound, and teach some of the fundamentals of traumatic infection.

A man was injured while employed as a sorter at the stockyards three hours ago. The fleshy portion of the upper third of the forearm was crushed by a recalcitrant steer in a muddy and manurey pen. The wound was imposed by the animal's hoof while the man's arm rested against a concrete watering tank. The patient was referred to the emergency room after being brought to a first-aid station in the vicinity where MERCUROCHROME® and a dressing were applied; because of the rather frightening appearance of the wound, the attendant sent him to the hospital. The attendant is a senior medical student who works in the first-aid station in the evening and who, incidentally, goes to another school, or he would not have used Mercurochrome.

We will teach, then, and demonstrate that here we have obviously a loss of superficial substance, devitalized tissue, exposed and damaged muscles, extravasated blood and foreign bodies consisting of particles of mud and manure and clothing. We will again use the coat hanger, and the base of this hanger we will name "contamination," which is obvious. The two oblique arms of the coat hanger we will name "local suppuration" and "invasive infection." Again we will "hang it on the hook" and compare it with shock by saying that the bacterial conditions in open wounds are not static. *The microscopic scene is a changing and dynamic one,* as is shock.

While others are estimating the general condition of this patient and his ability to withstand the debridement and open packing or closure to follow (no fractures were noted in the x-ray), we can again take down the coat hanger and discuss the trilogy of treatment—the broad base of the antibiotics and the allegedly more specific sides of gas and tetanus prophylaxis. A wound of this kind has all the

potential of a nonpenetrating war wound and gives us an excellent opportunity to discuss this whole subject. First, let me quote a brief report given one year ago by the Committee on Immunization Against Tetanus and Gas Gangrene of the American Association for the Surgery of Trauma:

1. Whether an active immunity with toxoid can be initiated at the time passive immunity is provided with antitoxin remains unsettled. There is good evidence that the antitoxin so provided will neutralize the toxoid, so that the subject will not be properly sensitized. If so, a subsequent injection of toxoid will not lead to an active immunity. There is, however, reason to believe that if the toxoid were to be given a few hours before the antitoxin, and preferably given intracutaneously, the subject would be properly sensitized.

2. For straight passive immunization, 5000 to 10,000 units of antitetanic serum are highly preferable to 1500 units. The larger dose provides better immunity during the crucial first week and cases developing in the first seven days give the highest mortality.

3. There is some conflict in the evidence of the rate of recall of active immunity by a booster injection of toxoid after a period of 8 to 12 years. It may not be recalled fast enough to protect during the crucial first week; hence, in wounds likely contaminated with tetanus spores in those immunized more than five years previously, passive immunity with a large dose of antitoxin should be provided. In addition, a booster injection of toxoid given in a different syringe and needle at a separate site should be given. *Please notice that there is a difference between initiating immunity and recalling immunity.*

4. Veterans, children and others previously immunized should receive routine booster injections every four years.

5. In individuals sensitive to horse serum, the danger of anaphylaxis probably exceeds that of tetanus, particularly when their wounds are not badly contaminated. In sensitive individuals with significantly contaminated wounds, gamma globulin or whole blood transfusion from actively-immunized donors may prove to be valuable.

6. Adequate antibiotic therapy serves as a deterrent to the development of tetanus.

7. Further investigation concerning this general subject is warranted. Particularly is there a place for investigation concerning the probabilities of producing an active immunity rapidly by the intracutaneous tetanus toxoid.

8. A program of mass active immunization of the population against tetanus should be initiated.

Now, what about the gas bacilli? I quote from the North Atlantic Treaty Organization Handbook:

> Early and adequate surgery remains the primary means of preventing gas gangrene with its threat to life and mutilating effects. With adequate surgery, it is possible to eliminate the conditions necessary for propagation of the clostridia. Chemotherapy is an established adjuvant if instituted promptly. The sulfonamide drugs are of no influence in prophylaxis or therapy, and neither are the antibiotics without adequate surgery. *The use of trivalent and pentavalent gas gangrene antitoxin is no longer recommended for prophylactic use.* Experimental studies are presently underway on possible active immunization by clostridial toxoids combined with tetanus toxoid.

The therapy of established tetanus or established gas gangrene, or established local suppurative or invasive infection, does not have a place in this discussion of emergency room treatment and teaching, but we have laid the groundwork so that these young men will be able to handle these kinds of situations more effectively.

Now we come to an aspect of the care of wounds of the extremities and the general conduct of treatment and teaching in the emergency room that is not so easy to define. It is a question being asked in many hospitals, and the answer is different in various parts of the country. Sometimes the answer is definite and other times it is split down the middle. The question is "What service or what specialty or what doctors should be responsible for the conduct of emergency room management and the teaching that goes on there?"

This question can be answered in part, at least as far as I am concerned, by imagining that I have been admitted to the emergency room of a hospital after an automobile acci-

dent. I have an open fracture of the shaft of the femur, and maybe some more underlying, more subtle things. (I did not have on a safety belt.) In the emergency room, I should be delighted to see a doctor with a surgical conscience, and one element of such a conscience is the compassion to be there—to see it yourself, because you know you won't be able to go back to sleep anyway and you might just as well go in the first place. I believe that I could recognize this even in my dazed state, and recognize that his interest goes beyond the debridement, VASELINE® gauze, whether to leave open or close, and other local considerations. He would look at me naked after my clothes had been cut off; it might be a short look, but it would be a discerning one. He might be thinking of the admonition of Marcus Aurelius in his Meditations: "Look beneath the surface. Let not the several qualities of a thing or its worth escape thee." He would watch and listen to me breathe. He would press lightly my belly, groin and thumbnail, and then issue orders to a group of interested men and women around him in a way that suggested that he had seen people like me before. I would then have less fear and more confidence, and that state of mind is excellent treatment for shock, at least the primary kind.

The following day, when on rounds, he would come to my bedside. I would not know him. Why? Because the night before he was wearing a mask; in fact, the night before they were all wearing masks, and this let me know that they had respect for secondary inoculation of any wound. I would feel better about the future course of my thigh wound because he knew about the dynamics of the bacterial flora in any wound; because he knew about serial bacteriologic studies made from the time of wounding to many days later in the hospital; because he appreciated the significance that haphazard handling has in the development of infection caused by coagulase-positive staphylococci, particularly those of human origin and in the hospital population.

You may not think masks are necessary in your daily hospital work with wounds, but we do; and perhaps we overdo it in making a particular point with our house staff. Those of you who do not wear masks when dealing with these wounds may be like the old obstetrician who, when asked, "Do you wear gloves when you deliver a baby?" replied, "Only when I have no time to take them off."

As time goes on and things improve with me, both locally and generally, I will begin to wonder whether this man is a general surgeon or an orthopedist, and then I will begin to wonder about the factors that influenced the decision as to whether I should be admitted on the orthopedic service or on a general surgical service; and I can hear the arguments that went on while the board was making this decision. They finally concluded that it makes no real difference which specialty these patients come under as long as the man responsible is interested in all phases of the clinical picture and competent to manage the situation, at least up to the point when various other surgical specialists might be called in for opinions.

The doctor who is best suited to take care of the really injured person in the emergency room of a hospital is one who has the broad outlook, who is looking into the small end of the megaphone and seeing the broad general picture of the patient, and not the doctor who is looking through the large end and seeing through the small end his own specialty. The Orthopedic Board is a relatively small one—about 2700—and there are not enough certified orthopedists to go around. We must have the interested general practitioner and the general surgeon who develop their skills in the management of patients with fractures and other trauma.

The emergency room can easily degenerate into a dull, boring interruption of our daily plan, but this can be prevented if you will remember that the word "doctor" by definition means teacher.

Teaching is not an activity that need be confined to a school. We spend our lives, or should, doing it: the mother to care for her baby, the cripple to walk, the nurse to hold retractors and to regulate and observe intravenous medications, and so on. When we forget this, we deprive ourselves of one of the great solaces that will lighten our daily load.

Fractures of the Face
(Dr. Wayne B. Slaughter)

The general problem of fractures of the face cannot be covered in a short discussion, and in order to pinpoint some of the pertinent factors it is necessary to focus attention on but a few facets of the subject. It seems logical to confine the discussion to the mechanical, physiologic or mechanophysiologic changes that have materially altered the concept of treatment of fractures of the face in the past 15 years.

Facial injuries seen today are quite different from those seen 15 or more years ago, and the patients are also different. In the past, the patient with a fracture of the facial bones usually was an adult male in the prime of life, possessing all or most of his teeth. Facial fractures usually were the result of physical violence, the object causing the fracture commonly being a fist. There were other causes, but for the most part the casualties were confined to the male adult group. At present, quite the reverse is true. Facial fractures usually are seen in patients other than adult males in the prime of life. The reasons for this shift in candidates are multiple, but mostly it can be blamed on the automobile, women drivers, and changes in industrial labor forces.

The automobile plays a leading role in facial fractures. In an accident, the steering wheel protects the driver to some extent, while the passenger beside the driver is thrown into the dashboard or windshield. Persons in the rear seat may be thrown against the front seat or the dash or out a window or door. Women drivers are to blame for the change in the types of patients seen with facial injuries merely because their total number has increased so rapidly and they usually have children in the car with them. When children are seated beside their mothers in the front seat, minimal impact forces can result in facial fractures. In industry, there are always certain hazards, but ironically there probably are more injuries occurring on the way to or from work than at work. Again, the increased number of women in the labor force has increased the number of industrial injuries in women. The home is still the locale of many injuries, but again the figures are altered to favor women and children largely because of the greater number of powered home appliances and the greater use of inside plumbing. The bathtub is the main offender.

Changes in the age and sex of persons involved in injuries have brought a change in the type of injury. In the days of the horse and buggy, or even when cars were slower, injuries usually were not too severe. Quite a different picture is presented when an automobile speeding at 60 or 70 mph meets an immovable object. Something has to give. Usually the passengers are thrown against hard stationary objects in the automobile or are thrown clear of the car, passing through a window or windshield on the way.

The resulting facial fractures present some bizarre pictures. Fractures of the lower jaw are still frequent, but they are now seen in conjunction with transverse facial fractures and zygomatic arch fractures. The upper jaw and varying amounts of adjacent structures may be separated from the base of the skull. There may be tears in the dura with varying degrees of dissolution of the cranial vault, introducing additional considerations and complications whose sum emphasizes the necessity of early treatment.

It is evident that treatment of fractures of the face must be adaptable to a wide variety of problems. Head bandages binding the lower jaw to the skull appear to be a ready answer to fixation of fractures of the lower jaw and even transverse facial fractures. The main objection is that they depend for fixation on fixed relationship with the skull. Unfortunately this technic is not anatomically compatible, since it does not allow for the "free way space" normally present between the upper and lower dentition when these structures are at rest. This method of fixation is therefore generally too rigid.

The time-honored method of using wire attachments to the teeth for stabilization still has wide application. In adults it has its most useful application in terms of wires placed around the teeth using the anatomic shape of the teeth to enhance stability. The wire is

placed low enough on the tooth so that when it is tightened it tends to be displaced away from the incisal edge of the tooth, this force increasing as tension is applied. Intermaxillary stabilization using various technics for the retention of the wires has been devised. This technic, however, has little or no application on deciduous dentition or in edentulous persons. In general, a wire placed about a deciduous tooth tends to be displaced toward the incisal edge of the tooth, thus losing all usefulness as a buttress for stabilization.

One of the most useful methods of recent years was developed by orthodontists and uses the deciduous teeth as a basis for stabilization of fractured jaws. It is merely an elaboration of the standard orthodontic procedures using bands on all available teeth and cementing these in place on the teeth. This removes any reliance on the anatomy of the tooth for retention of the stabilizing apparatus. The method can be applied in such a manner that the displaced fragments are slowly repositioned with minimal interference to growth centers, which is of prime consideration in these children. Orthodontic appliances plus open reduction in children and adults have been a boon for many persons with grossly displaced bony structures.

In a limited series of 25 consecutive cases of transverse facial fractures with complete or partial separation of the upper jaw from the base of the skull, there were no complications referable to the central nervous system attributable to early stabilization of the fractures. All the fractures were stabilized by means of wires placed around the teeth of the upper jaw and attached to a half-round arch bar placed against the teeth. A wire wrapped around this bar is passed through the cheek, high in the mucobuccal fold on either side, to be attached to a head cap.

If the patient is seen soon after the injury, open reduction is done, the dislocated fragments being attached to some bone that still retains stability. Open reduction is the method of choice and allows for early ambulation and early use of both jaws. Variations of the open reduction method are many. In cases of fractures involving the facial bones, stabilization is carried out by exposing the fracture site surgically and inserting a wire in small drill holes on either side of the fracture and bringing the fragments to position by tightening the wire. In the lower jaw it usually is necessary to insert two wires across the fracture site to maintain more positive stability. When placing these wires, one must take care not to encounter the apexes of the teeth or enter the mandibular canal.

In fractures of the maxilla, zygoma, frontal bones and particularly the region of the orbital rim, it is necessary to anchor the movable or free fragment thoroughly to some fixed or unfractured bone. Again, this may mean the use of a single wire or of many wires. As has been brought out by the late Dr. Adams, this technic with its many variations has a wide scope of application.

It will be noted that a discussion of the time-honored cast metal splint has been avoided. The reason is that the splint, constructed to fit over the teeth and cast to fit an impression of them, is slow in application and clumsy in operation. The same is true, for the most part, of the use of pins for fixation. The pin fixation method is used only under the following restricted conditions: (1) open bite, (2) lack of bony substance, and (3) lack of adequate dentition to establish occlusion when open reduction or other procedures are not indicated.

In summary, the technics for reduction of facial fractures have changed in the past 15 years, partly because of the technics themselves and partly because of a change in the type of patient seen with facial fractures.

Questions and Answers

DR. SCHWARTZ: I have a question addressed to the entire panel, and it is somewhat sadistic: "A 40 year old man, driving with his mother-in-law beside him, has a head-on collision during an argument. Without a safety belt, he is thrown against the old-style steering wheel, sustaining a depressed sternum. He is then thrown out the car door, alighting on his head on the pavement. Then he is run over across the thighs by a passing car. The mother-in-law sustains a windshield cut across her throat,

with severe hemorrhage and section of the trachea. You happen on the scene. What therapy should be instituted?"

The most all-inclusive prophylactic therapy in such a situation would be to advise that they conduct their arguments in the parking lot, but it is too late for that. This problem is similar to one that arose many times during the wars, and one has to use rapid judgment to decide which person to treat first. As I see it, there are two problems with respect to the mother-in-law, who has a windshield cut across her throat, severe hemorrhage, and section of the trachea. One is keeping the airway open. (I assume that the physician just happened along and does not have all his equipment with him.) He has to keep the airway open and he has to stop the hemorrhage apparently coming from the jugulars or carotid arteries. The only way I know of to do the latter is to stick your finger in the dike. Perhaps one might arrest the hemorrhage this way and at the same time succeed in keeping a tracheal laceration open. While one is doing this, what happens to the man? I do not know what a philosopher would do in a situation like this, but I probably would be inclined to pay attention to the man and let the woman take her chances—not because of any antagonism at all but on the basis of what the ultimate outcome may be.

The man is going to be in shock and is going to have respiratory difficulty. Respirations will be shallow and paradoxical, and apparently he has bilateral fractures or severe crushing injuries of both thighs. I do not think the head injury itself is of immediate importance so far as emergency care is concerned. For first aid, my feeling would be to attempt to splint both the chest and the legs as well as possible. Certainly out on the street or highway one cannot rig up an overhead traction to pull up the sternum, but one can relieve some of the respiratory difficulty by preventing the sternum from moving further in with each respiration. When the patient is taken to the hospital one can pull up the sternum, further splint the fractures of the femurs, and expect a reasonable chance of recovery of function.

If I were walking along with a fully equipped kit and had Dr. Hanlon with me, he probably would do something more effective to keep the airway open in the second patient (the mother-in-law), and also possibly to improve the impaired oxygenation in the man. I would like to pass this over to Dr. Hanlon, who has just come along with a fully equipped kit in his car.

DR. HANLON: Assuming that this woman is not going to bleed to death and the bleeding is threatening mainly the airway by bleeding into it, and that the main concern has to be the airway, probably the wisest thing to do about the severed trachea would be to pass an endotracheal tube. One would pass it into the upper part of the trachea and then, perhaps under direct vision, guide it into the lower part. It would serve both to re-establish an airway to the upper portion and to prevent leakage from the wound into the trachea.

If this procedure were not feasible, one could put a simple suture in the lower part of the trachea and pull it out for the time being, and when you get the patient to a place where you can carry out definitive treatment you probably would anastomose the trachea. A tracheostomy or temporary endotracheal tube, preferably the former, would be established above or below the area of suture and not directly through it, unless one were forced to establish it there. This temporary tracheostomy would permit healing of the transverse tracheal wound, which ordinarily would not be a complete severance—that is, not back through the membranous portion, although it is conceivable that it could be.

As for the man, a depressed sternum connotes bilateral fractures of the ribs or costochondral junctions. These have to be stabilized either by traction or by direct operative fixation. If they are associated with other evidences of flail chest such as paradoxical respiration and there is interference with effective exchange, then one of the things one can do is use a large stroke, large volume respirator that will splint the chest internally with every stroke.

DR. STACK: The first two questions I have ask for the names of booklets on trauma. One is "The Early Care of Soft Tissue Injuries."

It includes everything except the bone and joint structure. The other is "An Outline of the Treatment of Fractures." These booklets can be obtained by writing to the American College of Surgeons, 40 East Erie Street, Chicago 11, Illinois (attention, Secretary of the Committee on Trauma). Each costs $1.

There is a great deal of interest in prophylaxis against tetanus and gas gangrene. Someone asks, "Do you give tetanus antitoxin to every patient who has a break in the skin, or do you feel that we give tetanus antitoxin too frequently in instances of minor injury because of the medicolegal aspect?" That is a good question, and I think tetanus antitoxin is given far too frequently. Most of the wounds are not contaminated or have little if any possibility of contamination with tetanus spores, and we must remember that all of the clostridial group require the glycogen of damaged muscle in order to live; they do not do well in subcutaneous tissue with intact muscle and a good blood supply underneath.

We can draw an analogy between the giving of tetanus antitoxin to every patient whose skin is broken and the giving of antibiotics to every patient who has an operation. There are those who are overdoing it, certainly, and then there may be instances when the fellow who does not give it gets into difficulty.

DR. SCHWARTZ: "After a head injury causing only a few minutes of unconsciousness and no symptoms later, how long should the patient be kept in bed?" Formerly it was thought that after a head injury with any significant period of unconsciousness the patient should be kept down approximately two weeks. This was the teaching from the beginning of the century until the early days of World War II. The experience of the British during the blitz, when some of these patients could not stay in bed, showed that the ones who ambulated early did as well as, if not better than, those who stayed in bed at least two weeks. I think all of us have come to the opinion that the sooner a patient is ambulated, after a head injury or any injury, the better off he is, the less chance there is for a so-called invalid reaction, and the fewer complaints he will have referable to the head injury. Our policy at present in relatively mild head injuries associated with a few minutes of unconsciousness is to let the patients out of bed the following day if they seem to be doing well. We hope they will ask to be allowed out of bed (most of them will after they have tried to wrestle with a bedpan once), and if they do not ask we try to suggest it would be a good thing for them to get up.

DR. STACK: "Please clarify when to give toxoid and when to give antitoxin." This depends a great deal on the wound. If a person has been immunized previously with tetanus toxoid, you cannot get into trouble by giving him a booster dose. There is no danger connected with it, so why not go ahead and do it, particularly if he has been immunized within the last four years. If, however, he has a wound that is really suspicious, one that might harbor tetanus spores, you cannot depend on the toxoid to give good enough immunity in the danger period, which is the first seven days, and therefore you had better test him for his reaction to antitoxin and give that in order to cover him during that period.

DR. HANLON: I have three questions on tracheotomy. I am somewhat pedantic and refer to it as tracheostomy. "Should tracheotomy be done prior to atelectasis, bronchial plugs, etc. in a severe chest injury, or only after these have developed?" "How often is tracheotomy used and how often should it be used in severe chest injuries?" "What are the indications for tracheotomy?"

I think tracheostomy should be done in any instance of flail chest, wherever the continuity of the chest has been interrupted at several points, where there is paradoxical respiration; where it is accompanied by unconsciousness and you think the patient will not be conscious for some time and will thus be unable to raise secretions by voluntary effort, or if through any damage to the chest he cannot effectively cough and raise secretions. If, under other circumstances, you cannot get up his secretions by nasotracheal suction (and that may be because you cannot get in to his trachea or because it is cruel and inhuman to keep working on very copious secretions and causing the patient painful coughing spasms), often tra-

cheostomy is very beneficial. It reduces the dead space by 150 cc. or so, and in itself often is one of the best things one can do for a patient with a severe chest injury. We use it quite frequently in general surgical patients who are extremely ill.

DR. SCHWARTZ: We use tracheostomy from time to time in acute head injuries where there is difficulty with aeration. Indeed, in the past couple of years we have had a rash of tracheostomies reported in a large series of head injuries, and one would gather that the procedure not only is lifesaving but as time goes on it should be done more often. There always is a happy medium. Certainly the interest in tracheostomy in acute head injuries is justified, but in many instances it is overdone; and one of our greatest problems is to keep an overenthusiastic house officer from stabbing the trachea the moment a patient gets into the emergency room.

It is certainly true that one of our big problems with head injuries is to keep a good airway going. Without adequate oxygenation the damaged brain has a poor chance of survival. On the other hand, under ordinary circumstances, if the patient is placed in a head-down position with his face to the side, with good nursing care and gentle suction one can free the secretions from the tracheobronchial tree in most instances. There remain a few cases in which too frequent suction is required, with marked trauma to the trachea, and then a well-timed tracheostomy can indeed be lifesaving in cases of head injuries as well as in the thoracic injuries that Dr. Hanlon mentioned.

DR. STACK: Just to play with words for a moment, is it not true that we do a "tracheotomy" to create a "tracheostomy"?

DR. HANLON: Absolutely. You cannot do a tracheostomy without tracheotomy, but the state in which the patient ends up is tracheostomy, just as you do not have people going around after an abdominoperineal resection with a colotomy.

DR. STACK: That is right.

"Is the trivalent or pentavalent gas gangrene material harmful or of no value?" It is of no value, on two counts: It is of no value prophylactically, and it may give the doctor a false sense of security and keep him from doing as complete and thorough a debridement of all devitalized tissue, especially muscle tissue, as he should.

"Please repeat what was said about gas gangrene tetanus (trivalent) being ineffective." It is the consensus in this country, and it is in writing in the Manual of the Medical Department of the North Atlantic Treaty Organization, that it is of no value and should not be used prophylactically. When you are dealing with a patient who has established gas gangrene, that is another story.

DR. HANLON: "Please outline the treatment of sucking wounds in the chest." This is something that can be done very incorrectly. Perhaps one of the greatest mistakes is to stuff things into a sucking chest wound. Frequently in an automobile accident a sharp projection will lay open the chest, and if the hole is very big, this is incompatible, of course, with continued existence for long, because of progressive anoxia. If one stuffs something into the hole, it may act as a valve mechanism or may go into the chest and be ineffective. It is recommended that things be put *over* the opening; a handkerchief, towel or what have you, pasted over the opening, usually will suffice to prevent tension pneumothorax, or limit its extension, and save the patient until more definitive management can be accomplished in a hospital.

DR. SCHWARTZ: "Many of us are giving first aid to injured high school football players. A hard-hitting back is savagely tackled; he is knocked out, is motionless, face down, and has trouble breathing. Please combine your knowledge in giving us the best first aid and follow-up, and tell us how to determine when the boy is ready to return to play." I have three sons, I am on the local school board, and I also participate on the bench at times when these youngsters get injured, and I know it is very hard to keep a boy out of the game. Yet, when one looks at the over-all picture, it is far better to err on the side of safety and let the local school lose a football game now and then rather than to risk the welfare of a young player.

From the neurosurgical point of view the

first thing that comes to mind, of course, is that the boy probably was tackled from behind and has a so-called whiplash injury of the neck. The term "whiplash injury" is a misnomer, without any basis in pathology, and its use is to be condemned. There are cases of sudden deceleration resulting in strain or sprain, and occasionally dislocation of the cervical spine, which could cause this particular picture. The patient is motionless, he has trouble breathing, which is indicative of trauma to the upper cervical cord at about the level between the third and fourth cervical segments. His lack of motion may be due to complete loss of consciousness, or it may be due to complete quadriplegia or paraplegia. So the first thing I would be concerned about is whether the boy has a cervical cord injury.

Under the circumstances, so far as immediate first-aid treatment is concerned, I would have the game delayed several minutes until consciousness returned. In the ordinary case of cervical cord injury, consciousness returns in a very brief period. Then one can determine whether there is paralysis of the lower extremities. I would not move the boy for several minutes, to determine whether consciousness does or does not return. If there is evidence of paralysis of the extremities, I would have him rolled carefully onto a canvas litter, with one person holding his neck in a position of extension. After that, depending on the findings, one would decide whether to place him in continuous traction with tongs and subsequently with a cast. The possibilities of decompression operation in cervical spine injuries are relatively limited, but that may be considered later on. Other possibilities have to be considered: (1) The boy could have a ruptured viscus; (2) loss of consciousness might be due to associated sudden deceleration of a rapidly moving brain as the skull stopped against the crown, resulting in concussion of the brain superimposed on a rupture of a viscus, which would account for the difficult breathing and the apparent deep coma. He would have to be examined for all of these possibilities.

Now, when is he ready to return to play? If there is no evidence of cord injury or of ruptured spleen or other viscus, I probably would let him play in three to four weeks after he was over the injury. I would not let him go back too early.

DR. STACK: "In contaminated wounds in children who have been immunized previously with triple vaccine (in the past one to four years), is antitetanic serum, 1500 units, recommended, or is tetanus toxoid the agent of choice?" Within the one to four year period, tetanus toxoid certainly is preferred, particularly in the child.

Postgraduate Clinical NOTES

102. THE DANGERS OF BED REST

Early ambulation, if this is possible, and the prevention of physical and mental stagnation, if it is not, must be kept constantly in mind. Asher (1947) has painted a memorable picture of the evils of prolonged rest in bed:

"Look at a patient lying long in bed. What a pathetic picture he makes! The blood clotting in his veins, the lime draining from his bones, the scybala stacking up in his colon, the flesh rotting from his seat, the urine leaking from his distended bladder, and the spirit evaporating from his soul."

D. Craddock, Care of the bedridden patient, *Practitioner*, March 1958, p. 288

Physiology and Pathologic Physiology of the Testis

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THE testis performs two interrelated functions, the synthesis of steroid hormones and the production of spermatozoa. Considering the complexity of spermatogenesis, the sensitivity of the germinal epithelium to various physical and chemical stimuli, and the vulnerability of the testes to physical trauma, it is not surprising that some degree of testicular damage may be found in approximately 20 per cent of adult men.

Hormonal Relationships

Any defect in function of the Leydig cells or in spermatogenesis is reflected in hormonal alterations. Gonadotropins, for example, are elevated when there is any degree of primary failure of either the Leydig cells or the germ cells. Conversely, a lowering of secretion of gonadotropin by the pituitary gland causes functional and morphologic alterations in the testes. Similarly, failing function of the Leydig cells is associated with reduction in secretion and excretion of estrogen and androgen, and if the Leydig cells are stimulated excessively these two hormones increase.

Assessing these hormonally and morphologically interdependent alterations is useful in determining the exact clinical diagnosis and often suggests the type of treatment required.

The three well-known gonadotropic effects have been detected in urine and pituitary glands of normal adult men: (1) The interstitial cell-stimulating hormone (ICSH) or luteinizing hormone (L.H.) effects have been elicited in experimental animals by injecting extracts of human urine or pituitary glands. In hypophysectomized male rats, an increase in weight and size of the prostate gland, seminal vesicles and testes is prominent. In hypophysectomized female rats, luteinization and production of corpora lutea are the prominent

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features. (2) The follicle-stimulating hormone (FSH) effects of extracts derived from men have been deduced by noting the increase in ovarian weight and elaboration of estrogen (stimulated uteri) in hypophysectomized female rats. In the male rat, stimulation of germ cell maturation has been interpreted as an FSH effect. (3) The effects of luteotropic hormone (LTH) have been inferred from noting secretion of progesterone in hypophysectomized female rats (the antiwater-imbibing effect on the estrogen-stimulated uterus). One or more of the three gonadotropic effects have been noted in other species as well, particularly in the rabbit and in Amphibia.

Note that in the foregoing résumé we have used the word "effects" rather than "hormone." This reflects the inadequacy of our present knowledge regarding gonadotropins in human beings. A clear-cut clinical or chemical separation has not been accomplished, and therefore we do not know whether we are dealing with a single gonadotropin molecule having perhaps three prosthetic groups, or with three single gonadotropic molecules acting as independent hormones.

What are the effects on the human testis of "purified" gonadotropins derived from animal or human placental sources? Purified ICSH (actually, chorionic gonadotropin from human pregnancy urine has been the only generally available ICSH) stimulates development of the Leydig cells at puberty and maintains secretion of testosterone and estrogen during adult life. Some other consequences of administration of chorionic gonadotropin are growth of the seminiferous tubules and differentiation of immature Sertoli cells and spermatogonia. The latter effects most likely are secondary due to secretion of testosterone, since administration of testosterone under similar circumstances produces similar results. Purified FSH, derived from the pituitary glands of hogs, sheep or horses, has been transiently available for investigative use. It has quickly caused antihormone formation in human beings. However, such observations as have been made suggest that its function in men is to stimulate spermatogenesis from the spermatogonia stage through the primary and secondary spermatocyte stages to formation of spermatids and finally maturation of spermatozoa. In the species tested, luteotropin does not appear to have any function in males.

When man reaches adult status, the pituitary gland apparently secretes gonadotropin into the blood at a constant rate. Alterations in the rate of excretion that accompany failure of the seminiferous tubules or Leydig cells or both (in the absence of a pituitary lesion) appear to reflect the over-all activity of the testes. Thus the lowest excretion rate of gonadotropin occurs in normal men and the highest occurs in complete castrates. The magnitude of the difference is approximately 30 times. Thus a wide spectrum is available to judge the degrees of failure of germ cell and Leydig cell function in clinical conditions.

The explanation for these phenomena which most nearly fits all the facts is that the active testis utilizes (or inactivates) gonadotropin. Therefore, any failure of function will be reflected by an elevation in urinary gonadotropins. Because of the wide range, assay of urinary gonadotropins is the only quantitative laboratory method which accurately measures total testicular function.

The foregoing discussion might seem to imply that circulating androgen and estrogen do not influence secretion of pituitary gonadotropin. This is not the case. Amounts of androgen or estrogen *above normal physiologic amounts* do indeed inhibit pituitary secretion (and consequently excretion). This situation is observed when large amounts of estrogen or androgen are administered exogenously or are secreted endogenously by testicular or adrenal tumors. However, reduction of circulating estrogen and androgen during testicular failure seems to have little if any effect in producing the elevated excretion of gonadotropins.

When reduction of gonadotropin is produced by excessive estrogen or androgen or by the formation of antihormone after the administration of animal gonadotropin extracts, or when gonadotropin is reduced because of pituitary failure (as in chromophobe adenoma), the Leydig cells regress to mesenchymal cells and atrophy of the seminiferous tubules occurs, resulting in total testicular

atrophy and loss of spermatogenesis. It is interesting that sclerosis and hyalinization of the tunica propria and basement membrane of the seminiferous tubules always occur when gonadotropin is withdrawn.

Procedures to Evaluate Pituitary and Gonadal Function

Seminal fluid—The simplest procedure to evaluate the integrity of the entire male reproductive system is a sperm count. If the count is normal, one may conclude that both the hormonal and germinal systems are functioning normally. If oligospermia or azoospermia is noted, failure of any part or all of the system may be involved and further sampling will be required.

Urinary 17-ketosteroids—The Leydig cells as well as the adrenal cortex contribute to the urinary content of androgen and 17-ketosteroids, the adrenal cortex contributing five-eighths of the total. Hence, changes in urinary 17-ketosteroids within the limits of normal variation may be found when there is failure of the Leydig cells. Urinary 17-ketosteroids are elevated in disease of the reproductive system only in case of tumor or malignancy of the testis and are therefore of little or no diagnostic value in assessing testicular failure.

Urinary estrogen—The greatest portion of the urinary estrogen is contributed by secretion of Leydig cells. Some is contributed by the metabolic conversion of testosterone to estrogen, and a small amount comes from the adrenal cortex. When the interstitial cells of hypogonadotropic eunuchoid men or normal men are stimulated by gonadotropin, excretion of estrogen may increase fifteenfold to twenty-fold, whereas the increase in 17-ketosteroids is rarely doubled. Bio-assay or chemical determination of estrogen will reveal significant changes in function of the Leydig cells, but this procedure is not generally available to clinicians.

Urinary gonadotropins—The urinary gonadotropins are a sensitive indicator of disturbances of gonadal function, and their determination reveals whether the gonad or the pituitary is the site primarily involved.

Testicular biopsy—Microscopic examination of a specimen removed by testicular biopsy discloses the exact nature of the involvement. Obtaining an adequate wedge sample is a minor surgical procedure that can be performed in the physician's office. Since testicular architecture is fairly uniform and derangements usually involve all portions equally, the sample tends to be representative.

Fetal Physiology

During the eighth or ninth month of fetal life, in response to maternal chorionic gonadotropin which freely crosses the placental barrier, the testes migrate into the scrotum. At this stage the testes are receptive to the stimulation of the maternal chorionic gonadotropin, and well-differentiated spermatogonia and functional Leydig cells appear in considerable numbers. In contrast, the steroid hormones of pregnancy, estrogen and progesterone, do not enter the fetal circulation in direct proportion to their concentration in the maternal circulation. However, it recently has been demonstrated that estrogenic steroids are not entirely absent from the fetal circulation, and androgens administered to expectant mothers have produced clitoral hypertrophy in female infants. These observations suggest that steroid therapy should be used sparingly and judiciously during pregnancy.

Following birth, withdrawal of the stimulation of maternal chorionic gonadotropin causes the seminiferous tubules to decrease in size. The recognizable spermatogonia revert to a more primitive stage, the interstitial cells of Leydig disappear, and total testicular mass decreases.

Prepuberal Physiology

The testes remain quiescent from the early neonatal period until the age of four or five years. Then the tubules gradually increase perceptibly in diameter and there is a minimal maturation of germ cells. Excretion of androgenic and estrogenic steroids in the urine also rises slightly but significantly, generally between the ages of seven and eight years. Despite these minimal early stirrings, the child remains functionally hypogonadal until puberty. Therefore, one cannot attribute retarded

osseous development, obesity, or short stature to testicular failure before puberty occurs.

The incidence of cryptorchism is 10 per cent in infancy, 2 per cent at puberty, and 0.2 per cent during adult life. Thus most undescended testes descend spontaneously and only a small minority require surgical assistance to obtain their scrotal position.

The pseudocryptorchid testis, whose location varies between scrotal sac and inguinal canal, and the truly cryptorchid testis, having no mechanical barrier to descent, both assume a normal position early in pubescence. Since both types also descend in response to administration of chorionic gonadotropin, one may distinguish between them and an obstructed ectopic testis by injecting 4000 I.U. of chorionic gonadotropin intramuscularly three times a week for two weeks. Unless a mechanical barrier exists, the testis will descend promptly (within three weeks). This short-term intensive therapy does not cause other significant signs of sexual maturation and does not precipitate spontaneous puberty.

There is no gainsaying that body heat causes rapid, severe and irreparable damage to the ectopic testis within six months to one year after puberty. However, conclusive proof has not been submitted that body heat damages the ectopic testis prior to puberty. Such allegations have been made, perhaps because the cryptorchid testis may be congenitally defective. Because of the doubt, it would seem to be conservative practice to treat bilateral cryptorchism with chorionic gonadotropin as soon as the problem is noted. When to perform orchiopexy in obstructive cryptorchism to obtain optimal results remains controversial; we currently recommend surgical treatment during the first few months of puberty.

Puberty

Puberty is initiated by the secretion of gonadotropins, and the testes, the genital tract and the secondary sex characters quickly respond. The surge in secretion of estrogen and androgen by the stimulated Leydig cells often results in gynecomastia, detected as a plaque-like induration beneath the nipple shortly after puberty. The gynecomastia recedes usually by the age of 17 years. It occurs in approximately 75 per cent of all youths but usually goes undetected.

The median age for puberty in boys is 13 to 14 years; the majority begin to mature between the ages of 11 and 15. However, limits of normal puberty range widely. Premature homologous sexual maturation may result from adrenocortical, gonadal, hypothalamic or pituitary derangements. However, most instances of premature homologous sexual maturation represent physiologically normal puberty occurring at an inconveniently early time. One may substantiate this by determining the excretion of urinary estrogen, 17-ketosteroids and gonadotropins. The amounts will be higher than those in prepuberal children of the same age but will not exceed normal adult levels. The presence of urinary gonadotropins is evidence that other glands are not involved. When adrenocortical overactivity causes premature puberty, the amounts of estrogen and 17-ketosteroids are often distinctly elevated above normal adult levels and gonadotropins are generally absent.

Delayed Adolescence

Physiologically, delayed adolescence may be defined as a failure to mature at a chronologic age within the normal range for puberty. However, a boy who fails to mature at approximately the same time as his schoolmates often is subjected to psychologic and social pressure. The Leydig cells respond to ICSH stimulation at any age, and perhaps are more responsive at the age of 12 to 15 years, and hence the intramuscular administration of chorionic gonadotropins in doses of 4000 I.U. three times a week for six weeks will initiate spontaneous puberty.

Although puberal and prepuberal obesity is not the result of gonadal or pituitary dysfunction, obesity itself is at times attended by a delay in adolescence.

Adult Physiology

In the normal adult male, testicular function continues at a slowly diminishing rate throughout the life span. Testicular biopsy specimens from senescent men reveal active

spermatogenesis, although sclerosis of the seminiferous tubules is encountered frequently and the Leydig cells may show a variable degree of involution. A surprisingly large number of conceptions occur in marriages of senescent men to women of reproductive age. Because of the relative infrequency of marriages in which there is a very great age variance between the partners, the conceptions that occur are generally attended by widespread publicity; however, they are actually wholly in accord with physiologic and histologic findings. Determinations of 17-ketosteroids and bio-assay of androgens may show a minimally decreased excretion of steroid but the quantity is generally compatible with the over-all metabolic state.

Failure of Hormonal and Germinal Functions

Hypogonadotropic eunuchoidism—Hypogonadotropic eunuchoidism is characterized physiologically by failure of secretion of the gonadotropic factors, ICSH and FSH, which are absent from the urine. As a result, the testes remain unstimulated and their morphologic appearance microscopically resembles closely that of the preadolescent child, as to both germinal and secretory components. Hypogonadotropic eunuchoidism may be viewed as representing an indefinite postponement of puberty. The testes remain small. The seminiferous tubules contain mainly undifferentiated cells, germinal as well as the sustentacular cells of Sertoli, with an occasional differentiated spermatogonium. The interstitial spaces contain mesenchymal cells but no Leydig cells. The deficiency of testosterone results in failure of maturation of the epididymes, seminal vesicles, prostate, penis and scrotum. The voice remains high-pitched. Hair on the body, extremities and face is absent, and the scalp line does not recede. Epiphysial closure is delayed, sometimes for several decades, permitting continuing slow skeletal growth, which makes for tall stature and the long arms and legs characteristic of the eunuchoid habitus.

The adrenal cortex plays a minor but detectable role in sexual maturation. In untreated hypogonadotropic eunuchoid men, as well as women, pubic and axillary hair appears at the time of expected puberty but remains incompletely developed. At the same time, the excretion of estrogen and 17-ketosteroids becomes discernible. These changes are attributable to adrenocortical activity which is not dependent on the presence of gonadotropins.

Administration of chorionic gonadotropin to hypogonadotropic eunuchoid men causes rapid sexual maturation and an increase in size of the testes. Excretion of estrogen and 17-ketosteroids rises promptly, often to greater than normal levels during treatment. The interstitial cells of Leydig appear in abundant numbers and exhibit secretory granules. The seminiferous tubules enlarge, and Sertoli cells, spermatogonia and primary spermatocytes become differentiated. The germ cells increase in number, but their maturation does not proceed to completion.

As in delayed adolescence, spontaneous puberty may ensue after 6 to 36 months of treatment of hypogonadal eunuchoidism, or the patient may at least maintain the artificially induced gain. This depends apparently on the capacity of the hypophysis to elaborate enough gonadotropin to maintain testicular function. In some instances this never occurs. The optimal dosage schedule for treating this syndrome is 4000 I.U. of chorionic gonadotropin, intramuscularly, three times a week.

The Hypergonadotropic Syndromes

The eunuch—Eunuchism is the best-known example of the syndromes in which the primary site of failure is the testis. As with other syndromes, the time of castration determines the subsequent clinical pattern. The prepuberal eunuch develops a tall eunuchoid skeleton, remains sexually infantile, and has gynecomastia and elevated gonadotropins when chronologically he has passed the time of expected puberty. The man who is castrated during adult life does not experience skeletal changes, and accessory and secondary sex characters regress slowly and incompletely. The most prominent features of adult eunuchism are sexual impotence and androgen-withdrawal vasomotor symptoms resembling those of the menopause. The long-continued nega-

tive nitrogen and mineral balance expresses itself in osteoporosis and in poor bone and wound healing after several decades.

Functional prepuberal castration—This resembles prepuberal eunuchism except that the absence of testicular tissue, or its complete atrophy, occurs as a result of causes other than ablation. It may occur during intra-uterine life. Wolffian duct derivatives are usually found in the scrotal sac. A hint that the testes probably develop normally for a time during fetal life and then atrophy either in the late intra-uterine period or postnatally is derived from the observation that all such patients tested have a normal male chromatin pattern; that is, in contrast to Klinefelter's syndrome, these are genetic males.

Adult hypergonadotropic hypogonadism or the "male climacteric"—This condition results from failure of the Leydig cells during adult life. It may occur at any time following puberty, either spontaneously or as a result of mumps orchitis, bilateral cryptorchism, leprosy or Klinefelter's syndrome, or in association with the muscular dystrophies. Onset may be sudden or gradual. The consequences are identical to those that occur in adult eunuchs. The male climacteric is an intercurrent and intervening process not related to aging.

Substitution therapy using testosterone or one of its esters is the treatment of choice in the hypergonadotropic syndromes. This includes "Klinefelter's syndrome" with failure of the Leydig cells. Optimal results may be obtained by administering unconjugated testosterone pellets subcutaneously every four to seven months, injecting 200 mg. of testosterone enanthate intramuscularly every 18 to 25 days, or injecting 50 mg. of testosterone propionate intramuscularly three times a week. Sublingual or oral administration of methyltestosterone or fluoridated methyltestosterone is an incomplete and unsatisfactory method of treatment.

A new approach to "rejuvenating" the failing Leydig cell function in the male climacteric and in "Klinefelter's syndrome" is the administration of large doses of testosterone propionate (50 mg.) *daily* for *six weeks*. Within two weeks after treatment is discontinued, Leydig cell function may "rebound" and may remain normal for months or years.

Failure of spermatogenesis—This is the most common type of testicular deficiency. It may be divided into six categories.

Puberal seminiferous tubular failure or "Klinefelter's syndrome"—This pathologic process has its onset at puberty and appears simultaneously with puberal maturation of the tubules. Disorganization and sloughing of germinal elements and sclerosis and hyalinization of the tubular membranes go on interdependently as well as independently. The testes become markedly atrophic, urinary gonadotropins are greatly elevated, and azoospermia occurs. Some years later the Leydig cells fail as well. This syndrome appears to be of congenital origin. In most cases there is a female sex chromatin pattern, and the suggestion has been made that the patients were destined to be females but the cortex of the gonadal anlage atrophied leaving the medullary portion to form a testis.

Germ cell aplasia or Sertoli-cell-only syndrome—This is a congenital phenomenon or a result of complete sloughing of germinal elements, e.g., following exposure to radiation. The tubular size and membranes remain normal but germinal elements are not observed. The Leydig cells remain normal.

Spermatogenesis cannot be stimulated in either puberal seminiferous tubular failure or germ cell aplasia.

Sclerosis of the seminiferous tubules—This condition involves either the basement membrane or the tunica propria, usually both. A moderate degree of sclerosis reduces the mean diameter of the tubules significantly, thus reducing the volume of germinal tissue. The process of peritubular sclerosis generally is accompanied by sloughing of immature germinal epithelium and a disorganization of spermatogenesis in the cells remaining within the tubules.

Disorganization and sloughing of germinal epithelium—This process may occur independently of prior tubular sclerosis. The normal cohesiveness of the germinal epithelium is reduced in some cells so they slough into the lumen of the tubule prior to completion of

maturation, producing a disorganized appearance of the intact germinal elements. All stages of cell development, from spermatogonia on, often can be identified in the debris within the lumina of the affected tubules. When the process is extensive one may find only Sertoli cells within some tubules.

Germ cell arrest—In germ cell arrest the maturation of the germ cells is abruptly halted at some stage of spermatogenesis, commonly at the primary spermatocyte stage. Less frequently, spermatogenesis proceeds as far as the spermatid stage, and rarely the defect appears at the secondary spermatocyte stage. In some instances every tubule is involved and no sperm is found in the seminal sample. In other cases only partial arrest occurs, and some tubules are spared. Germ cell arrest may be an inherent defect or may be transiently induced by either a severe illness or drugs.

The hypercellularity syndrome—This syndrome is associated with relatively low sperm counts and generally there is no perceptible defect histologically other than that spermatogenesis proceeds to and occludes the lumina of the tubules. Urinary gonadotropin titers generally are normal.

Applying the "rebound phenomenon" to the hypercellularity syndrome, the disorganization and sloughing syndrome, and the peritubular fibrosis syndrome appears to be of distinct value in restoring spermatogenesis. Three sex hormones have been effective in suppressing spermatogenesis completely—testosterone, estrogen and progestin. Following cessation of therapy, spermatogenesis is gradually resumed, and in 6 to 24 months it may be much improved compared with pretreatment findings.

Postgraduate Clinical NOTES

103. HORMONAL THERAPY FOR HYPOGONADISM

An important decision which must often be made by a clinician is whether to leave cases of juvenile hypogonadism untreated awaiting spontaneous puberty, or to institute hormonal therapy. If the decision is in favor of hormonal therapy, at what age should it be started, and in what form? The problem revolves around the possibility that administration of hormones may cause too rapid or too premature an acceleration of sexual development and thereby bring about some associated undesirable effects through the action of the selected therapy upon organ systems other than the gonads. In addition to the choice of the appropriate form of therapy, the optimal time for institution of endocrine treatment requires the expert judgment of the physician. Therapy, when appropriately administered, may insure adequate sexual development so that the hypogonadal male can be prepared to achieve his birthright of procreation and marital bliss more effectively.

Herbert S. Kupperman and Jeanne A. Epstein, Hormonal therapy versus watchful waiting in hypogonadism: The male, *Journal of the American Geriatrics Society*, February 1958, pp. 87-98

Radioisotopes in Gynecology

As Applied in Pelvic Malignancies

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INTRODUCTION

THE two main weapons in treatment of cancer of the female pelvis are radiation and surgery. The team for application of radiation therapy consists of one or more clinicians, a radiologist and a physicist. More and more, treatment of pelvic cancer is being funneled into centers of specialized training, which offer the best possible diagnostic work-up and definitive therapy. In addition to the safeguards necessary for maintenance of radioisotopes, technical training and knowledge are required for therapeutic application. Rigid adherence to the safety measures outlined by the United States Atomic Energy Commission is necessary to obtain the best possible results.

Adapted from an exhibit presented at the annual meeting of the American Medical Association at New York.

RADIOACTIVE GOLD (Au^{198})

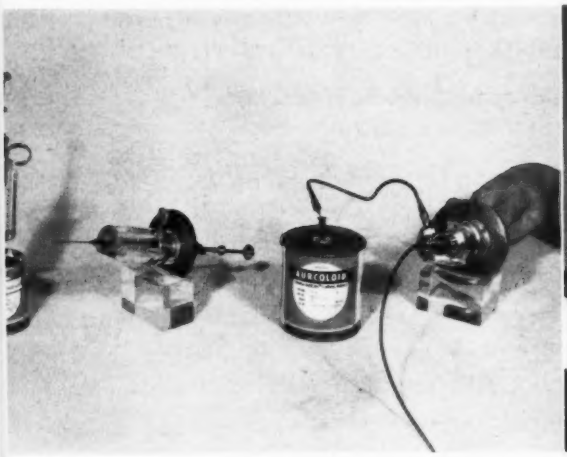
Ascites

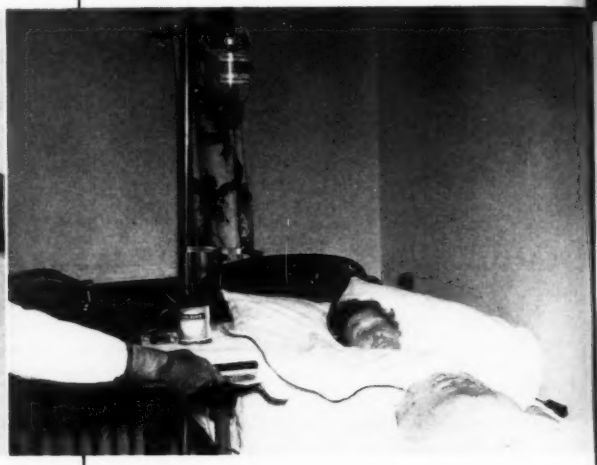
Application of radioactive colloidal gold in ovarian malignancy has a twofold basis: prophylaxis, to prevent ascites after operation, and palliation, to decrease its production. In cases in which ovarian carcinoma may have spread to the peritoneal cavity, the beta rays have prophylactic value. They give only a superficial depth dose but are selective for the abnormal carcinoma cells. Palliatively, colloidal gold radiates the source of peritoneal irritation active in production of ascites.

At University Hospital, since 1952, radioactive colloidal gold has been used for prophylaxis and treatment of ascites in 40 cases. Four patients did not have ascites prior to treatment, and ascites did not develop. From 35 to 150 millicuries of Au^{198} was instilled via a polyethylene tube which either had been inserted in the peritoneal cavity at operation or had been introduced after paracentesis. It was diluted with 100 to 500 cc. normal saline solution.

Types of Pelvic Tumor Treated With Au^{198}

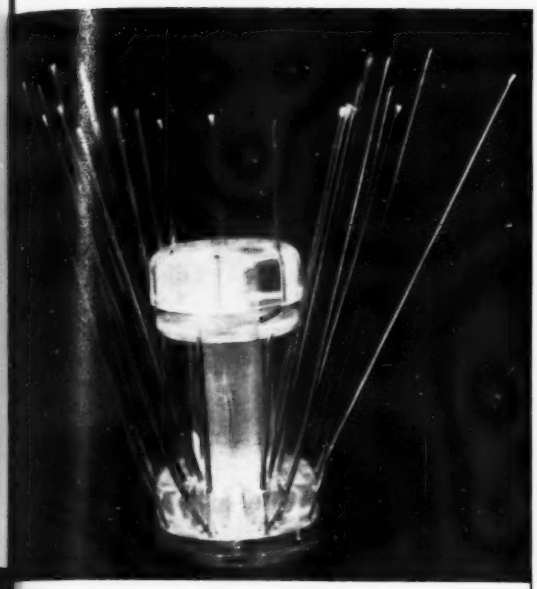
Ovarian		22
Adenocarcinoma	21	
Granulosa tumor	1	
Poorly differentiated adenocarcinoma		1
Cervical (epidermoid) carcinoma		1
Rhabdomyosarcoma of the uterus		1
Botryoid sarcoma		1
		26





Results of Treatment of Ascites With Radioactive Gold (Au^{198})

- Complete remission of ascites, 25 per cent
- Some remission of ascites, 50 per cent
- Relief of pain, 50 per cent
- No remission in cases of sarcoma
- Nine of 26 patients with pelvic malignancies living after 2 to 17 months
- Eighteen patients (66.6 per cent) are dead (seven died within six weeks, 11 within five months —therapy started too late)
- No complications from administration of Au^{198}
- Prophylactic use gave best results

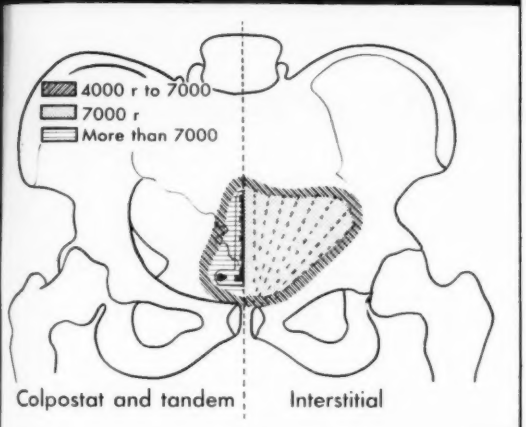


RADIOACTIVE COBALT (CO^{60})

INTERSTITIAL NEEDLES

Carcinoma of Cervix

Lucite templates are used for uniform placement of Co^{60} interstitial needles. To compensate for the decreased gamma radiation at the area of divergence, the distal portion of the needles are given a heavier load. The fundamental plan was to furnish a dose of 6000 to 7000 r to the tumor.



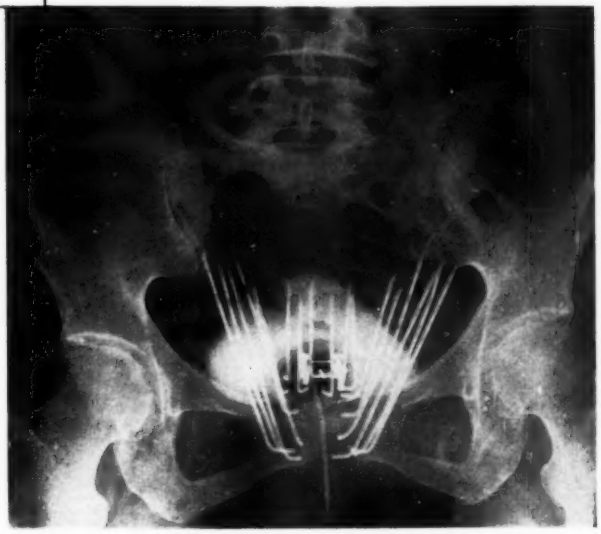
Five Year Survival of Patients With Cervical Carcinoma Treated With Co^{60} Interstitial Needles

Classification	Number of Patients	Per Cent
Stage 1	2 of 3	66.7
Stage 2	17 of 35	48.6
Stage 3	13 of 51	25.6
Stage 4	1 of 11	9.0

Absolute five year survival, 33.3 per cent.

Complications

Rectovaginal fistulas	9
Vesicovaginal fistulas	7
Ureteral obstruction requiring transplant	1
Obstruction of large bowel requiring colostomy	8
Obstruction of small bowel	1



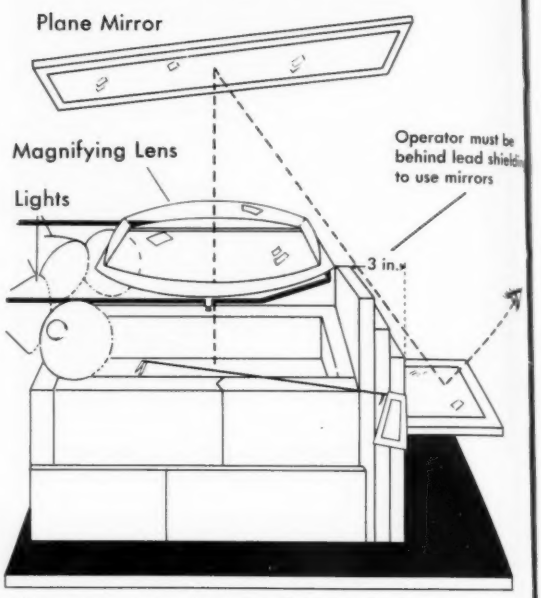
RADIOACTIVE ISOTOPES

Radioactive isotopes are produced at Oak Ridge, Tennessee. Intense bombardment by neutrons in the nuclear reactor alters the atomic number of the basic elements, and new elements are formed. These new or unstable elements have the property of radioactivity, producing electromagnetic waves which under the proper control may be applied in radiation therapy of pelvic malignancies.

ADVANTAGES OF RADIOACTIVE COBALT (Co^{60})

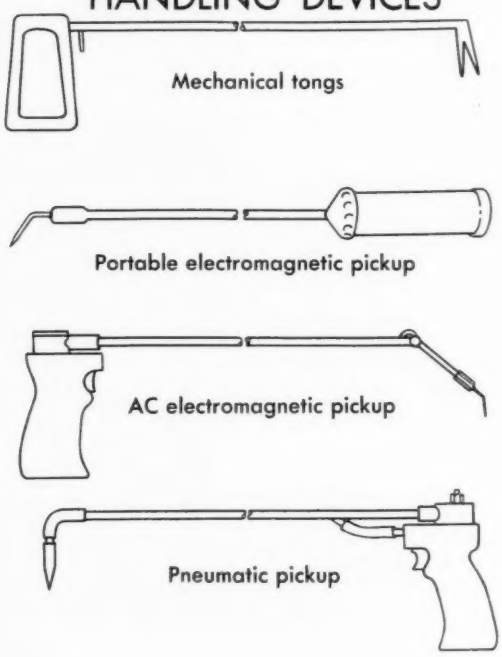
1. Gamma radiation is more homogeneous (1.17 and 1.33 mev).
2. Beta radiation softer (0.31 mev maximum) and more easily filtered out, and there is less bulk.
3. No radioactive gas leakage.
4. Cobalt alloys are chemically inert.
5. Danger of breakage eliminated.
6. No localization in bones (ions quickly eliminated).
7. Sources are magnetic (safer and easier to handle).
8. Alloys containing cobalt are inexpensive.
9. Co^{60} may be generated in any quantity.
10. Strength can be calculated before irradiation in atomic pile.

WORK CENTER

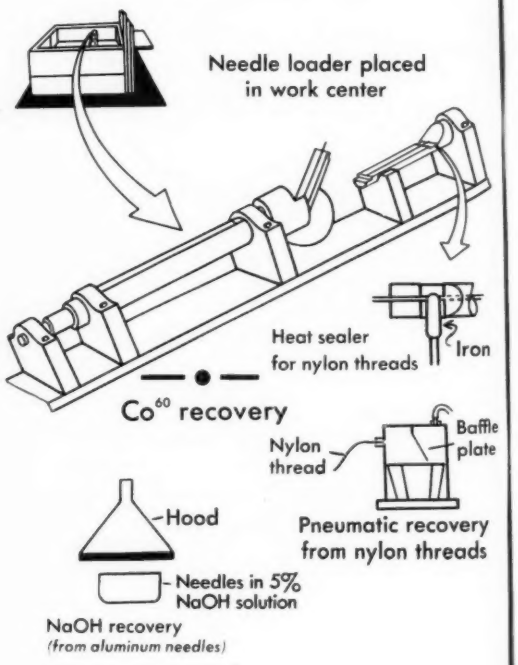


All procedures in handling of Co^{60} (needle loading, cartridge recovery, etc.) are carried out at remote-control work center. Double mirrors permit direct vision technics.

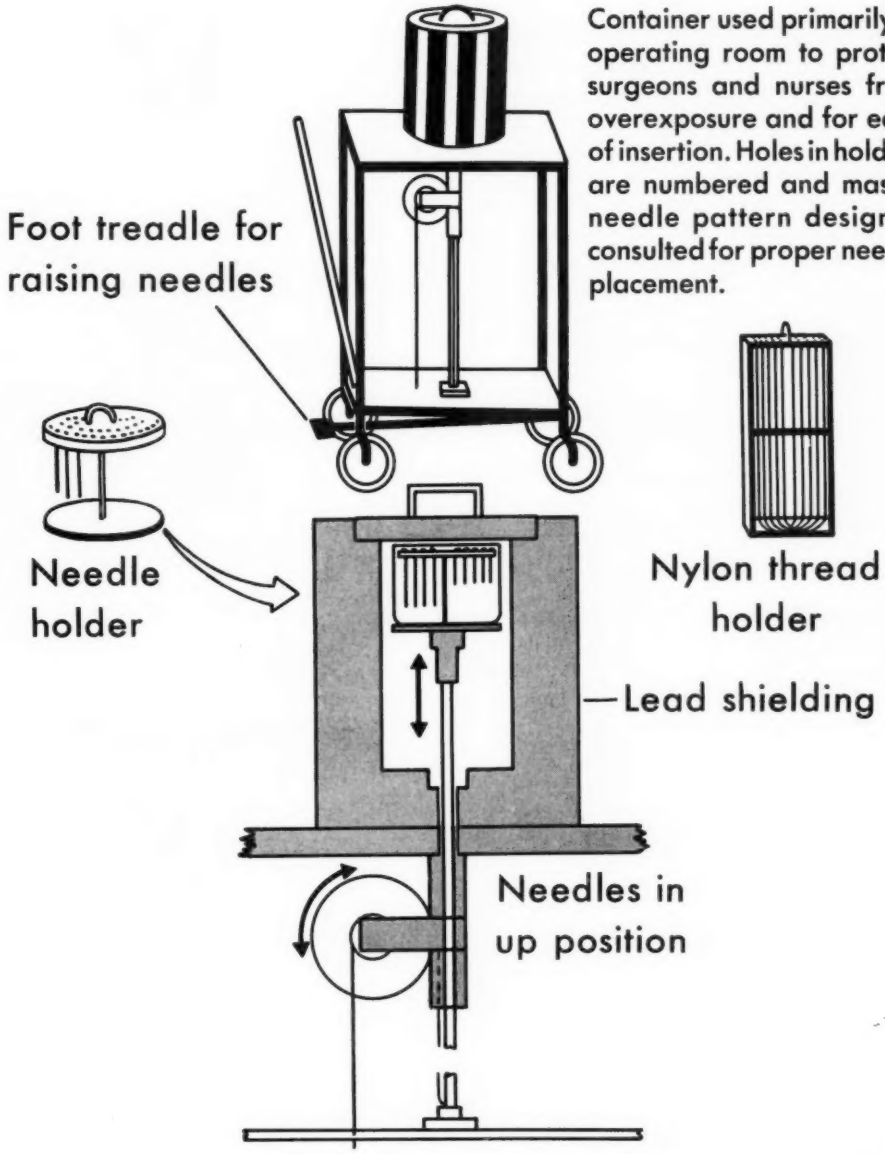
REMOTE-CONTROL HANDLING DEVICES



NEEDLE LOADING



PORTABLE CO^{60} CONTAINER


Container used primarily in operating room to protect surgeons and nurses from overexposure and for ease of insertion. Holes in holders are numbered and master needle pattern design is consulted for proper needle placement.
Foot treadle for raising needles
Needle holder
Nylon thread holder
Lead shielding
Needles in up position

COBALT (CO^{60}) COLPOSTAT and TANDEM

Carcinoma of Cervix

The present form of application of radioactive cobalt is the colpostat and tandem. The tandem is that portion of the cobalt machine that is inserted in the uterine cavity. Colpostat refers to the part that is placed transversely across the cervical face.

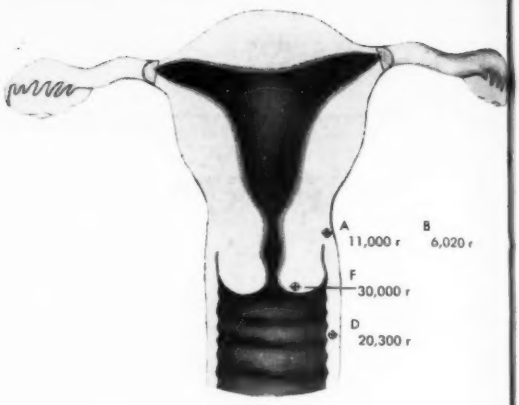
Colpostat and tandem therapy is instituted only after a positive tissue diagnosis. Preliminary medical study includes chest x-ray, intravenous pyelograms and gastrointestinal x-ray studies to rule out extrapelvic metastases, and complete physical and medical work-up.

The average program of therapy is as follows:

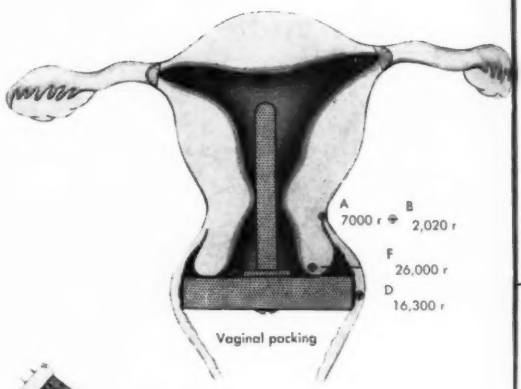
1. Careful pelvic measurements.
2. Insertion of colpostat and tandem of proper size.
3. Initial application left in place approximately 72 hours (central therapy dose of 3500 r to point A).
4. Three day rest.
5. Second application of colpostat and tandem, 3500 r to point A.
6. Supplemental deep external x-ray therapy twice a week to give a tumor dose of 4000 r.

Five Year Survival Rate
All Types Cancer of Cervix

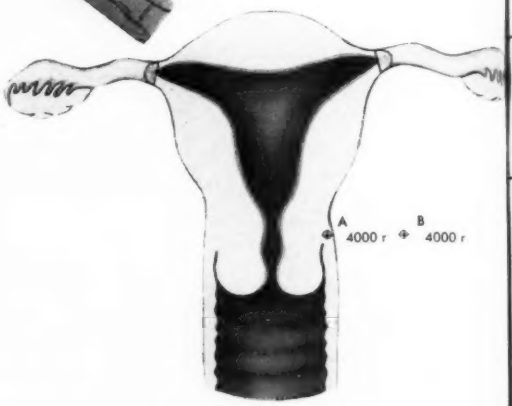
Classification	Per Cent
Stage 0	94.7
Stage 1	78.6
Stage 2	49.3
Stage 3	26.4
Stage 4	2.2



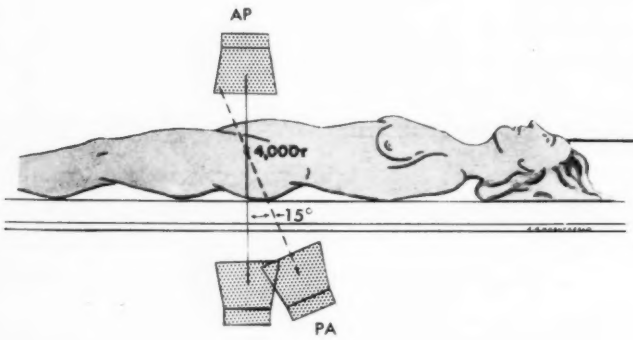
Total irradiation



Cobalt application



External x-ray irradiation



Factors: 15x15 cm. ports. Ant. and Post. (Post. angle 15°)

50 cm. focal skin distance (250 K.V.P. Thor. 3 3mm. H.V.L. Cu)

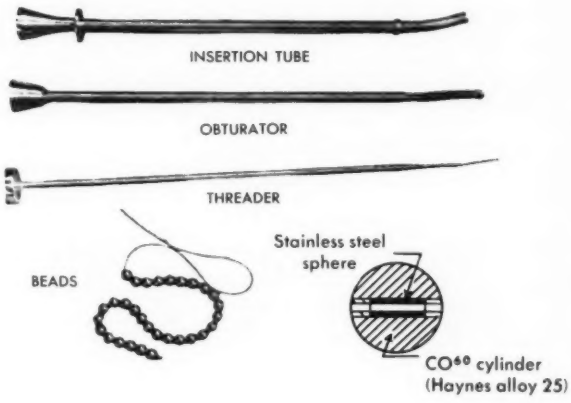
COBALT (CO^{60}) BEADS

Carcinoma of Corpus (Endometrium)

Co^{60} beads were devised to obtain a more uniform isodose curve about the uterus in cases in which irradiation alone was employed because the combination of preliminary irradiation and surgery was contraindicated owing to the risk of surgical treatment.

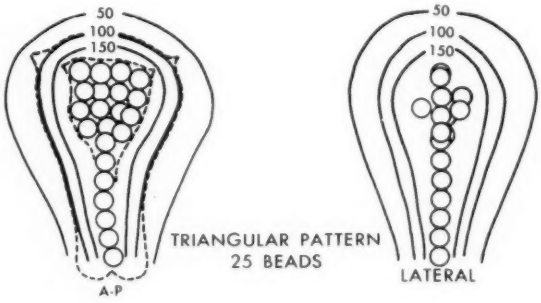
The center of each stainless steel bead was loaded with radioactive cobalt material and the beads were linked together so they could be packed inside the uterine cavity. The theory was that a multiple source of irradiation would give uniform dosage throughout the cavity. A special packing device, a funnel-like tube, was employed.

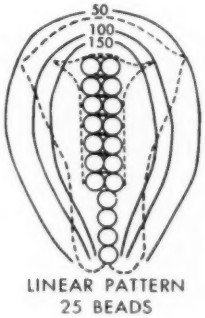
The five year survival rate in a group of 169 cases of endometrial carcinoma treated by this method was 66 per cent.

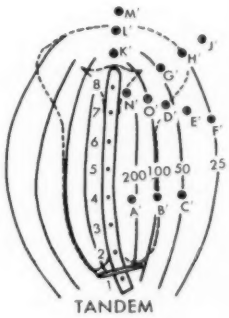


Number of beads in pack	Roentgens per hour at exterior wall of uterus*		
	Linear pattern	Triangular pattern	Spherical pattern
10	23	25	28
15	35	29	38
25	53	40	53
35	56	72	75
50	69	88	96

*The reference point is taken to be approximately 1.5 cm. lateral to the endometrial surface at a level bisecting the length of the bead pattern.







Treatment of Diabetes

Insulin Therapy

ARTHUR R. COLWELL, JR.*

Northwestern University Medical School, Chicago

Oral Therapy

RACHMIEL LEVINE†

Michael Reese Hospital, Chicago

Statement by Dr. Colwell:

IT is the contention of this discussion that insulin is superior to tolbutamide in the therapy of diabetes. In the last three years, the orally administered sulfonylureas have been introduced to eliminate the inconvenience of daily insulin injections. Since administration of insulin usually satisfactorily controls diabetes of almost any severity, improving individual comfort is the only reason for developing other methods of treatment.

Although the sulfonylureas have been studied carefully and their use has been widely accepted, many of their shortcomings are not commonly realized. Much of the evidence gathered concerning their mechanism of action is contradictory, and their application must be considered experimental in nature. It is still too early to evaluate the true biologic effect of the sulfonylurea compounds, to be aware of all the possible complications, or to realize the ultimate influence of these compounds on the diabetic state.

ARTHUR R. COLWELL, JR.

The most important objection to tolbutamide therapy is its inability to fulfill a physiologic need. Diabetes mellitus is a result of insulin deficiency in the pancreas; only insulin by injection can adequately replace this endogenous lack. Although it is probable that tolbutamide stimulates the beta cells of the pancreatic islets to release insulin, the exact manner in which this compound lowers the blood glucose is unknown. Potentialization of the action of insulin already present in the circulation may

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†Chairman, Department of Medicine, Michael Reese Hospital, Chicago, Illinois.

play an important role. It should be emphasized, however, that the *hypoglycemic* effect known to occur with administration of the sulfonylureas is not synonymous with an *antidiabetic effect*. The compounds fail to correct many of the metabolic effects resulting from uncontrolled diabetes which have been proved to be due to insulin deficiency, namely, negative nitrogen balance, reduced respiratory quotient, excessive ketone formation and impaired glycogen storage. The sulfonylureas are not a form of insulin and must not be considered as substitutes for insulin.

It has been stated that those patients who react best to the sulfonylureas need them least. Many of these are patients who eat too much and are obese. Approximately 80 per cent of diabetic patients are overweight. It is obvious that weight reduction with a suitable diet is the treatment of choice for this group. One-half of the patients with diabetes can be controlled by diet alone. Yet a considerable number of these persons are permitted to ignore the fundamental dietary measures by the convenient substitution of a tablet or two daily. It is claimed that at least half of the diabetic subjects respond satisfactorily to tolbutamide, but the correct figure is undoubtedly somewhat smaller. Many patients in the studies in which this claim is made were treated at the same time with diet. More careful experiments, utilizing longer control periods before addition of the drug, indicate a lower incidence of successful therapy. Therefore, it is quite possible that many patients are now being treated needlessly, because they seemed to respond initially to a trial period.

Since the action of tolbutamide on blood glucose is delayed in its intensity, the drug cannot be utilized to control the acute complications of diabetes. Patients who have ketosis, coma, surgical stress, febrile disorders or liver or renal disease should be treated with insulin alone. One of the major hazards concerned with the widespread adoption of the orally administered compounds is the occurrence of acidosis due to stopping insulin in order to begin sulfonylurea therapy. Substitution of tolbutamide for insulin usually is not successful, although it may often appear so because the patient receiving a small dose of insulin frequently is able to get along without it. Insulin treatment is definitely advisable in children and in most patients less than 40 years of age. It should be used for patients who have the more severe and labile forms of the disease, especially if it is of more than five years' duration. Patients who have taken insulin for more than five years in a dosage of more than 30 units daily will seldom be able to get along without it. There is no reason to utilize both agents together except for temporary transition periods.

Once therapy with tolbutamide is instituted, it must be continued permanently, since no cure can be expected. Therefore, even minor toxic effects assume considerable importance. Although no deaths have been reported, there is a 2.3 per cent incidence of untoward reactions; skin rash, gastrointestinal symptoms and leukopenia are the most common. The sulfonylurea compounds are goitrogenic in doses of 2 to 4 gm. daily, but probably not in the usual smaller therapeutic doses.

A careful sugar balance may be maintained with insulin even in the severe type of diabetes, particularly when such difficulties as infections, emotional stresses and variations in exercise appear. It is the consensus that normoglycemia is desirable, because comfort and well-being are maintained and complications of the disease are prevented. Supplying tolbutamide often fails to control the blood sugar adequately in the presence of the problems listed in patients who have been treated previously with insulin. Since temporary administration of crystalline insulin is necessary to handle acute complications of diabetes even in patients being treated orally, the technic of insulin injection must still be taught to all candidates for sulfonylurea therapy. Although hypoglycemic reactions from tolbutamide are rare, they do occur, particularly during the period of transition from insulin therapy.

It would be unfortunate if the general adoption of tolbutamide therapy should result in a depreciation of the training standards for diabetic patients. They should be impressed with the importance of persistent control and educated in the usual diagnostic and therapeutic

measures. The simplicity of oral treatment must not interfere with the doctor-patient relationship and its accompanying awareness of blood sugar control through the years.

The long-term effects of pancreatic islet stimulation by the sulfonylureas are unknown, and only degranulation, not exhaustion, of the beta cells has been conclusively demonstrated. However, certain patients have been reported to exhibit increased glycosuria and hyperglycemia from tolbutamide administration, particularly if large doses have been given. It is quite possible that the sulfonylurea compounds lower blood glucose by some pathologic mechanism not yet identified. Perhaps more intriguing and significant than their therapeutic application is the role the sulfonylureas play in clarifying the nature of pancreatic insulin secretion and even of diabetes itself.

Statement by Dr. Levine:

THE literature on the mode of action of the sulfonylureas in lowering the blood sugar level indicates quite strongly that these drugs stimulate the beta cells to secrete insulin. There is some evidence that large doses of such drugs may potentiate the hypoglycemic effect of exogenous insulin. In addition, investigators have shown that the sulfonylureas may inhibit sugar output by the liver, but such an action might be the effect of endogenous insulin secretion.

These data explain why juvenile diabetics and adults with very severe diabetes do not respond favorably to these drugs. The patients who react well and in whom control is maintained over a period of years are those with mild to moderate diabetes of adult onset. It must be remembered that this latter group comprises about half the diabetic persons in our population.

The question therefore arises whether or not orally administered drugs should be given to *all* patients whose diabetes could be controlled by this therapy. With our present knowledge the answer is probably *no*, because of the following considerations: A large number of the patients responsive to drugs have mild diabetes accompanied by obesity. If at all possible, an attempt first should be made to reduce the patient's weight by prescription and maintenance of a proper reducing diet. In successful cases, adequate diabetic control is achieved without using insulin or oral drugs. Achieving weight reduction is not an easy matter without the proper psychologic motivation and the sympathy of the physician. It is far easier for the physician to prescribe drugs that will reduce the glycosuria but maintain an oversupply of body fat.

Tolbutamide (ORINASE®), which is currently available, has an unusually low incidence (1 to 3 per cent) of toxic reactions. On the basis of present experience, it seems unlikely that this drug will have any deleterious effect even after many years of use. Of this we can be reasonably confident but not certain.

Since the drug cannot provide the body with a large amount of insulin at any one time, the patient must be instructed in the use of insulin for periods of infection, severe trauma, or other conditions which raise insulin requirements.

Oral therapy is particularly indicated for: (1) patients in whom diabetes developed in adulthood and whose general condition militates against using hypodermic injections, e.g., those with disturbed vision or neuromuscular problems or aged persons living by themselves; (2) patients, such as engineers or salesmen, whose occupation makes it difficult to carry insulin kits with them and to administer injections of the hormone; (3) patients who have an abnormal fear of injections; and (4) patients who experience sensitivity or local tissue reactions to insulin.

For the large number of patients whose condition can be controlled equally well by insulin or by the oral drugs, the choice is a matter of convenience only. The physician and the patient should decide on the method of treatment, taking into consideration all the factors mentioned previously.

Comment by Dr. Colwell:

The conclusions presented on both sides of this question are strikingly similar and almost entirely in accord. It is agreed that sulfonylurea therapy is not indicated for juvenile pa-

tients or for severe diabetes or disease that is accompanied by complications, Thus, the discussion focuses on that small area in which the decision must be made whether or not to administer the agent orally to an adult patient with mild, uncomplicated diabetes. If this debate has raised any issue, it is the question of replacing a small dose (less than 30 units daily) of insulin with tolbutamide in such a patient.

Diabetes of this type is easily and efficiently controlled by a single daily dose of DEPOT® insulin. The patient is trained in the technic of administering insulin and is capable of switching rapidly to a crystalline form if any complication arises. Because of the daily ritual of injection, the patient's attention is drawn to the importance of diabetic control. He maintains a careful quantitative glucose balance aided by frequent blood sugar estimations. By contrast, the patient who is taking an orally administered agent is not particularly motivated to maintain an accurate dietary intake. and some of these patients may even be tempted to stop taking the tablets.

There is no good physiologic basis for choosing sulfonylurea in preference to insulin. Although tolbutamide somehow stimulates the production or increases the action of endogenous insulin, it fails to accomplish most of the antidiabetic effects of insulin. In addition, it may fail to inhibit the circulating factors responsible for the degenerative vascular complications of diabetes. While the precise nature of these substances is unknown, certain evidence indicates that good diabetic control by means of insulin may prevent their adverse effects.

Physical handicaps and insulin sensitivity in the diabetic patient are practical but infrequent factors in deciding whether to use orally administered agents or injections. Often the patient's desire for convenience and comfort in his program assumes greater importance than the judgment of what is best for him. Physicians usually advise using the sulfonylurea agents merely to eliminate the discomfort of an injection; however, it seems doubtful that this attitude is justifiable in view of the considerations presented.

Comment by Dr. Levine:

Dr. Colwell and I have not expressed widely divergent opinions; however, I do not agree that the orally administered agents now in use produce hypoglycemia by means of pathologic changes. The bulk of evidence now indicates that they act mainly by discharging endogenous insulin at a slow rate.

Dietary abuse may occur with insulin therapy as well as with the administration of the sulfonylureas.

Diabetic persons who respond to tolbutamide probably do not have an insulin deficiency in the pancreas. They seem to be unable to mobilize the insulin as needed. It appears that this drug enables the beta cells to discharge insulin, thereby repairing the defect, namely, circulating active insulin. This has recently been demonstrated by a most sensitive technic for the assay of plasma insulin.

Although it is not an ideal orally administered agent, tolbutamide is a worthwhile addition to therapy for adult diabetic persons when given to properly selected patients and with good general management.

CLINICAL STUDY

A New Compound for Analgesia

A.P.C. WITH DEMEROL®

HENRY BODNER, ALLAN H. HOWARD AND JOSEPH H. KAPLAN

Los Angeles

HENRY BODNER

ALLAN H. HOWARD

JOSEPH H. KAPLAN

MEPERIDINE hydrochloride (DEMEROL®) is a well-established medication which has been used for many years as an analgesic, antispasmodic and sedative agent. The analgesic action of meperidine approaches that of morphine in effectiveness and has been compared with morphine and codeine in both animals and man by demonstrations employing numerous pain threshold technics, by the potentialization of barbiturate hypnosis, and by the premedication effect in nitrous oxide anesthesia. It has been definitely shown that meperidine is a more potent analgesic than codeine,[1] but is not quite as potent as morphine.

The spasmolytic action of meperidine hydrochloride also has been demonstrated. This action is due in part to a depression of the parasympathetic endings and to the result of a direct depressant effect on the muscles. The spasmolytic action of meperidine on the urinary bladder is, of course, desirable. In clinical trial, meperidine also has been found to exert an analgesic and mild sedative effect and to be relatively nontoxic. It has been further demonstrated that the drug is absorbed rapidly when administered orally. Its antispasmodic action offers a definite advantage over the opiates. It not only contributes to the rapid and, often, dramatic relief of colicky pain but also obviates the undesirable constipation commonly seen after opiate therapy.

Following the oral administration of me-

peridine hydrochloride, an analgesic effect is apparent within 20 to 60 minutes. This effect lasts from two to six hours, with an average duration of three hours. Its spasmolytic action makes it ideal for the relief of conditions due to smooth muscle spasm in which morphine is pharmacologically contraindicated. Its rapid dissipation tends to offset undesirable cumulative effects such as respiratory depression and urinary retention.

Relief of pain following cystoscopic manipulations and procedures and urethral instrumentation, and relief of colic due to ureteral calculi provide a good yardstick for the clinical evaluation of any analgesic compound. There are many efficient drugs available for this purpose, but the individual patient's sensitivity, the incidence of nausea and vomiting, the production of euphoria, and the development of tolerance requiring larger doses of the medication must be considered. Many analgesic compounds contain an opiate, such as codeine plus salicylates and phenacetin with caffeine and atropine. The sum of the effect of these various compounds is greater than that of the single drug and thus allows for a smaller dose of the narcotic drug. Meperidine hydrochloride has been used for many years and provides relatively safe and efficient relief of pain. It produces very little respiratory depression in clinical doses and causes a low incidence of allergic reactions.

Methods and Material

In this study we tested a new oral compound consisting of 30 mg. meperidine (Demerol), 200 mg. aspirin, 150 mg. phenacetin and 30 mg. caffeine. This combination is known as A.P.C. With Demerol.* One hundred consecutive patients, 54 men and 46 women, between the ages of 22 and 68, who had been subjected to cystoscopy and catheterization of the ureter, cystoscopic manipulative procedures, bladder fulguration, urethral manipulations and dilatations were given the medication. A number of patients with ureteral colic also received the drug. The patients were instructed to take 1 tablet every two to four hours as necessary for relief of pain. Each patient received a total of 6 tablets. Patients were questioned regarding (1) the amount of pain relief; (2) the duration of relief; (3) side reactions, i.e., nausea, vomiting, rash, diarrhea, etc.; (4) euphoria, and (5) the number of tablets necessary for relief of pain.

We did not consider it necessary to use placebos in this study, since the components of the mixture have been used individually and prescribed together for years. Having all these standard components together in a single tablet is a convenience which the practicing clinician appreciates. The percentage of satisfactory results compares favorably with orally administered analgesics which we have used in similar cases.

*Winthrop Laboratories, New York.

TABLE 1

RESULTS OBTAINED IN 100 PATIENTS TREATED WITH A.P.C. WITH DEMEROL

RESULTS	NUMBER OF PATIENTS
Relief of pain*	
Good	82
Fair	12
Poor	6
Duration of relief	
Less than 1 hour	18
More than 1 hour	82
Reactions	
Nausea	1
Rash	0
Vomiting	0
Diarrhea	0
Euphoria	
None	94
Mild	5
Marked	1

*The relief dose consisted of 1 tablet for 82 patients, 2 tablets for 17 patients, and 3 tablets for one patient.

Results

In summarizing the results obtained with this preparation (table 1), we found that 82 per cent of patients received a satisfactory degree of relief, with only a 1 per cent incidence of side effects, if euphoria is not considered. The latter action was present in a relatively few cases, and some may think of it as a desirable effect.

Our results are quite in keeping with those reported by Cronk and Naumann,[2] who treated painful conditions other than those due to urinary tract disorders. The relief obtained in our series of patients also gives further evidence of the clinical value of the spasmolytic activity of Demerol, which has been reported by a number of investigators.[3-8] A.P.C. With Demerol thus fulfills a need for a preparation which is more potent than the non-narcotic analgesics alone, yet which obviates the use of full doses of a narcotic drug.

Summary

One hundred adult patients subjected to various urologic manipulative procedures (cystoscopy, ureteral instrumentation, urethral dilatations, etc.) were treated with a new, orally administered analgesic tablet combining A.P.C. with Demerol; satisfactory analgesia was obtained in 82 per cent of patients.

This combination of agents permits a lower dosage of the narcotic, with excellent tolerance and a low incidence of mild side effects (1 per cent). In the types of urologic pain treated, this tablet appears to be more effective than codeine-aspirin combinations. In addition to the combined analgesic potency of a smaller dose of narcotic, A.P.C. With Demerol also has an antispasmodic effect on the genitourinary tract, which probably accounts for its analgesic effectiveness.

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MEETINGS *and Postgraduate Courses*

Tulane University School of Medicine, New Orleans: Short continuation courses for 1959:
- Infectious diseases of the eye, January 12-17
- Emergencies in medicine, January 28-30
- Pediatric dermatology, February 16-21
- Surgery of trauma, February 26-28
- Anesthesia, March 5-7
- Pediatric hematology, April 9-11

For further information, write to: Director, Division of Graduate Medicine, 1430 Tulane Avenue, New Orleans.

University of Michigan Medical Center, Ann Arbor: Postgraduate brief review courses for 1959:
- Pediatrics-obstetrics and gynecology, January 26-30
- Internal medicine:
  - Pulmonary diseases, March 16-20
  - Therapeutics, March 23-27
  - Diseases of blood, March 30-April 3
  - Diseases of the heart, April 6-10
  - Electrocardiographic diagnosis, April 13-18
  - Rheumatology, April 20-24
  - Metabolism and endocrinology, April 27-May 1
- Ophthalmology, April 20-22
- Otolaryngology, April 16-18
- Diagnostic radiology, April 6-10

For further information, write to: Dr. John M. Sheldon, Director, Department of Postgraduate Medicine, 1610 University Hospital, Ann Arbor, Michigan.

University of Texas Postgraduate School of Medicine, Houston: Fourth annual course in anesthesiology, February 18-20. For further information, write to: The University of Texas Postgraduate School of Medicine, 410 Jesse Jones Library Building, Houston 25.

Editorials

Postgraduate Medicine

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SYLVIA COVET

THE MEDICAL PROFESSION AND THE INDUSTRIAL COMMISSION

It is perhaps a foregone conclusion that all administrators of workmen's compensation laws have their respective problems in determining many medical issues. Perhaps 98 per cent of all claims processed by administrators of workmen's compensation laws involve some degree of medical issues. For purposes of brevity, these issues can be listed as follows:

1. Was the conceded or alleged injury responsible for producing any given type of pathologic condition?
2. What is the extent of temporary total disability resulting from the injury?
3. What are the nature and extent of the resulting permanent disability?
4. To what extent are additional medical care and treatment needed?

Almost all cases coming before the commission for formal hearing involve a controversy regarding medical opinions. These different opinions may exist in any one or all of the forenamed categories. To render adequate justice in disposing of such claims, it is necessary that a person have a reasonably good knowledge of medicine and human anatomy. Some of this information can be obtained from medical textbooks, and perhaps the most valuable information can be secured through personal discussions of the issues with competent medical men.

Perhaps the most difficult problems to resolve are those involving conflicting medical testimony on causal factors of either a conceded or alleged injury. I have in mind the development of such conditions as periostitis, osteomyelitis, malignant conditions of either the soft tissues or the bony structure, mental conditions, and cardiac involvements.

I am certain that most if not all administrators at times become confused in attempting to make valid decisions in these cases. As a rule, these disputes concern findings of fact as distinguished from issues of law. In most jurisdictions, a finding of fact made by the administrative agency results in final adjudication, with testimony in the record supporting the finding made. On the other hand, the appellate courts do not hesitate to reverse administrative agencies on those cases involving issues of law. Further complications arise over

securing a true history of what the involved person was actually doing at the time of the injury and the symptoms immediately following the conceded or alleged incident. These histories often are distorted by both lay and medical witnesses.

Doctors must realize the absolute need for securing a detailed and accurate history of either the alleged or conceded injury and the symptoms which followed its occurrence. This information, whether secured by a doctor or lay person investigating the claim, becomes materially important in the final determination of many claims. We know that histories are extremely important to either examining or attending physicians in making a proper diagnosis and in determining the nature of the existing pathologic conditions and whether or not these conditions can be related to the injury.

The life and duties of an administrator could be made far more pleasant if all medical men were entirely honest in their testimony and expressed opinions. This statement is not intended to imply that doctors as a rule are dishonest. Their views at times seem to be somewhat influenced by whether they are generally known and accepted as either plaintiffs' or defendants' doctors. Continuing retainers for defendants bring medical men in contact with some unscrupulous plaintiffs or claimants who are attempting to obtain benefits where they are not due. This misrepresentation can be found in the histories given by plaintiffs, perhaps a natural tendency to exaggerate or magnify their complaints, and extends to unquestionable malingering. Likewise, a few insurance adjusters and employers attempt to take undue advantage of claimants.

Fortunately, the majority of claimants make honest claims for compensation; this is also true of the majority of both the attending and examining physicians. Normally there is no valid reason for anyone to distort the actual or prevailing facts, and thus there is no justification for material differences on medical issues.

The Wisconsin commission has attempted to eliminate these problems insofar as possible. Progress in this regard has been accomplished only through unselfish and outstanding support from qualified medical men in our state. With the assistance of medical advisory committees, our commission has set up certain standards and guides for some of the medical problems.

Assisted by a group of eye specialists, the Wisconsin commission has developed a medical questionnaire on eye disability. The attending physician on all eye disability cases is required on discharge of the patient to fill out one of these questionnaires, answering all questions relating to the nature, extent and history of the injury and the symptoms following the injury, specifically mentioning all existing pathologic findings. This same advisory committee developed a formula whereby the existing pathologic condition can be transposed into percentage loss of vision in cases of permanent disability.

Another medical committee assisted the commission in designing what is known as the relative permanent disability schedule. This formula relates to all extremities of the body, including the various digits at all of the involved joints. Designated percentages of disability are allowed for certain restricted movements of the involved extremity or joint.

The last schedule developed relates to occupational loss of hearing. The advisory committee consisted of five otologists, who devised the formula in a series of seven lengthy meetings. Adopted in 1955, this formula has been requested by other states. The problem of impaired hearing resulting from occupational noise is a common one to most states and at best is difficult to determine. Any or all of these formulas can be amended by the commission when circumstances indicate such action is necessary.

Any new formula is given wide publicity following its acceptance by the commission. A year or two of use is sometimes necessary before the formula and its application are properly understood. It is surprising to observe how these various medical formulas tend to lessen the number of controverted claims coming before the commission. For example, prior to the adoption of the relative permanent disability formula, it was common to have ex-

treme variations in the estimate of permanent disability for an ankylosed knee. Medical estimates varied anywhere from 15 to 100 per cent permanent impairment of the leg at the knee. According to the stipulation in the adopted formula, the allowance for a knee ankylosed at 170 degrees represents 40 per cent permanent impairment of the leg. We know that all knee injuries do not result in ankylosis, but the established guideposts assist materially in determining other degrees of impaired motion in the knee.

I am sure that every administrative agency of workmen's compensation recognizes its responsibility with respect to the prompt payment of compensation. Wisconsin has established an enviable record in this regard by having prompt payment of compensation made in 95 per cent of the total claims occurring in the state. Such a result can be obtained only through the cooperation of all parties interested in claims handling. This involves insurance representatives, self-insured employer representatives, medical men and attorneys. It requires prompt and specific medical reports from the doctors concerned. As soon as possible, the doctor should attempt to decide when the claimant will be able to resume any form of work. In some cases it is desirable to have a person resume work on a partial basis to strengthen and restore the injured member or portion of the body. Any major permanent disability should not be determined, if possible, until at least three months following the injured person's return to work. It is desirable that doctors estimate approximately when compensation payments should be discontinued and work resumed. In Wisconsin, we have been exceptionally fortunate in receiving cooperation and assistance from members of the state medical society.

R. G. KNUTSON
Chairman
Wisconsin Industrial Commission

INFECTIOUS HEPATITIS

ONCE known as catarrhal jaundice, infectious hepatitis is now recognized as a condition caused by a virus which is spread in the feces and in contaminated food and water. The Russians call it Botkin's disease.

An issue of the *Abstracts of Soviet Medicine*,[1] published quarterly by the Excerpta Medica Foundation, includes a score of references to articles in Russian medical literature published during 1956 and 1957 indicating that they are as baffled as are physicians anywhere else in the world in their approach to this disease. The studies come from the medical clinics of Moscow, the Blood Transfusion Center in Kursk, the Pediatric Medical Institute of Leningrad, the Institute of Virology of the U.S.S.R., as well as clinics in Chernovtsy and Minsk.

A casual survey of the reported studies, many of which have been accumulated in a special volume on Botkin's disease published in Moscow in 1956, indicates nothing startling or new, except a report from Odessa by A. M. Goncharuk that mud treatment was quite helpful in inducing speed and completeness of recovery. Forty children, 2 to 14 years of age, who had Botkin's disease were given mud treatment after the disappearance of acute symptoms, which was approximately the fourth week. Mud at a temperature of 38° C. was applied over the liver every one or two days for 15 minutes. Twelve applications were made usually, but in six children the number was increased to 15 to 18 applications. Improvement appeared after six or seven applications. Twenty of 40 patients were discharged as clinically recovered, whereas, in the 20 others, residual symptoms were noted, such as enlarged liver and decrease of liver function. Of 42 children who were not given mud treatment, only 13 were discharged as clinically recovered. When the children were examined after one year, 23 of those treated with mud were found to be well as compared with only 11 in the control group.

This form of physical therapy is obviously not a specific form of treatment. Among other treatments used were transfusion of compatible blood, venesection, antihistamines (particularly Dimedrol, which is a Soviet product like BENADRYL®). In the First Medical Institute of Moscow, 56 patients with acute and 20 patients with chronic Botkin's disease were

treated with lipocain, which is equivalent to 50 gm. of fresh pancreas given three to four times daily, combined with a compulsory diet of 200 gm. of cream cheese or 200 gm. of oatmeal porridge daily. The investigators report improvement in the general condition, decrease of the splenic and hepatic enlargement, and regression of the jaundice with recovery of liver function. A number of patients also received four to six injections of vitamin B_{12} every third day.

These random observations made in a number of different institutions in Russia contrast strangely with an intensive study of epidemic hepatitis recently conducted by Ward, Krugman, Giles, Jacobs and Bodansky[2] in the Willowbrook State School in Staten Island and the Division of Metabolism and Enzyme Studies of the Sloan-Kettering Institute for Cancer Research. The Willowbrook State School is an institution for mentally defective persons with a roster of some 4,478 patients. Between 200 and 250 patients are housed in each of 18 buildings. Many patients eat in the building where they live. Ambulatory patients eat in two central buildings. The water supply is the same as that of New York City, and sewage disposal is adequate. Only a few cases of hepatitis with jaundice occurred sporadically before 1953 when 40 cases were reported. In 1954 there were 47 cases; in 1955, 106; in 1956, 95, and during 10 months of 1957, 60 cases. Because of this high incidence the control of the disease became a primary concern. A large-scale immunization program with gamma globulin was initiated. Patients were divided into groups for study—the inoculated subjects to be compared with the uninoculated controls. A significant reduction in the frequency of hepatitis followed the use of gamma globulin, but the results were not as striking as those reported in other studies. The investigators believed the difference was due to the fact that Stokes had used 0.06 ml. of gamma globulin per pound of body weight among his patients, whereas the Willowbrook group used 0.01 ml. per pound of body weight. A second trial was made using larger doses, comparing 1,182 patients who were inoculated with 1,771 not inoculated. During the ensuing 39 weeks, 44 cases of hepatitis with jaundice occurred, including two cases among those inoculated as compared with 42 cases among those not inoculated.

In the Willowbrook study also the parents of patients agreed to permit studies which involved the making of liver function tests and the feeding of a suspension of virus before and after protection with gamma globulin in various groups. After the feeding of hepatitis virus, incubation periods ranging from 31 to 75 days were noted. Hepatitis virus was shown to be present in the feces excreted two or three weeks before the onset of jaundice. Infectious hepatitis like poliomyelitis appears to have an alimentary tract phase in which the virus is multiplying and being excreted at a time when no signs or symptoms and no evidence of liver dysfunction are present.

MORRIS FISHBEIN

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ALCOHOLISM

Estimates indicate that about five million people in the United States can be diagnosed as alcoholic, with about 200,000 new victims each year. Certainly a specific method of treatment applicable in all cases has not yet been found. However, a number of technics seem to yield a modicum of success. The American Medical Association has a committee on alcoholism which is a division of the Council on Mental Health. The approach to the problem includes medical, educational, communal and religious aspects.

Many basic factors in alcoholism have not yet been definitely determined. Obviously the exact cause or causes remain to be discovered. The methods of treatment have not been of much assistance in determining the cause, since no one method is successful in a high percentage of cases. Psychotherapy alone may

result in a 10 to 15 per cent recovery. Drug treatment combined with psychotherapy may be more helpful, since the use of suitable drugs aids the psychotherapist in relieving the patient of the most difficult of withdrawal symptoms. The conditioned-reflex treatment, which has been in use for some 20 years in the Washingtonian Hospital of Boston, involves the establishment of revulsion which is, in fact, the basis for use of ANTABUSE®. An efficiency of from 40 to 60 per cent in securing total abstinence from alcoholic beverages has been claimed by several institutions which employ this method.

In the conditioned-reflex technic, emetine is used to produce emesis. Immediately prior to the expected emesis the addict is exposed to the sight, smell and taste of the alcoholic beverages that he preferred. The treatments are under the immediate control of an attending physician experienced in the method and are associated with psychotherapy. Side effects of the use of emetine have included diarrheas, neuromuscular disturbances and, rarely, cardiovascular reactions. Relapses have occurred for a variety of reasons. When they occur, the method is reinforced by further treatments. The contraindications described by Thimann[1,2] include an intelligence quotient well below 100, constitutional mental disorders, lack of intellectual or emotional ability that is sufficient to recognize the need for permanent abstinence, a record of criminal offenses, and combinations of alcohol and drug addiction. The record of successful results over a period of 20 years is about 50 per cent.

Golin[3] has described alcohol as "robber of five million brains." In his review of the subject, he pointed out the variety of forces now involved in attempting to solve the problem of the alcoholic. Outstanding is a quotation from Dr. Marvin A. Block, Buffalo, who is chairman of the American Medical Association's committee on alcoholism:

> In the chronic alcoholic we are dealing not only with a sick individual but with that individual in relationship to his environment. There is no miracle drug that will do away with the illness. There is no known cause of this disease, no constant symptomatology, no specific treatment, no foolproof method of picking out victims in advance. An alcoholic's proneness to the disease is a secret between him and the bottle. And so the physician must not only rehabilitate his patient physically, he must help him to mature emotionally. This requires time, investigation and patience—one does not scold a sick person. We cannot afford only to be doctors. We are also citizens. This means that it is also the responsibility of physicians to do such things as help mobilize lay forces fighting alcoholism and inform legislatures of what they think should be done to help solve the problem. For it is a problem which ultimately affects—sociologically, psychologically and economically—every single man, woman and child in the United States. The physician has in the alcoholic a challenge from which he cannot retreat.

MORRIS FISHBEIN

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PSYCHIATRY AND THE ENVIRONMENT

A NEW YORK interior decorator who specializes in furnishing homes and offices for psychiatrists says, "A quiet room is better than a tranquilizing pill any day and, besides, it lasts longer." A feature writer in the *New York Times* insists that the decorator is so good at his job that most patients entering a room that he has designed "feel their jangling nerves go limp before reaching the analyst's couch." Because he thinks that colors can either put one to sleep or excite him, he stays away from brilliant reds and uses mostly warm beiges and bland golds. He uses furniture that he calls "unobtrusive modern." The chairs and the couches are covered with fabrics with subdued patterns. As the writer says, "Anybody can take a Hoffmann couch lying down."

Thus, the modern analyst's couch is not a lumpy old piece of furniture such as was used by Sigmund Freud but a rectangular divan without arms, filled with foam rubber. So that the analyst can be comfortable, he is provided with a special kind of a lounge chair, but to make sure that he will not doze off while taking notes, the back of the chair is in a permanent vertical position. The carpets are thick and wall to wall, and the doors and walls are soundproof. A specialist in physics and noise analysis who cooperates with the interior decorator has classified the analysts according to the amount of noise they generate.

The concept of interior decoration designed to suit the specialty of the physician offers opportunity for a wide range of imaginative thinking. The surgeon's room might be colored in red to blend with the blood necessarily flowing from his patients. The ophthalmologist's walls could be in black, the better to fix his view on the beam of light from the ophthalmoscope, and the type of decoration desirable for other specialists, I leave mercifully unsuggested.

MORRIS FISHBEIN

MORTALITY TRENDS AND FUTURE PROSPECTS

In the United States the best records for life expectancy at birth are those of the rural Northwest Central area. The five states with the poorest records are in the South and Southwest and include New Mexico and Arizona. These facts indicate to Dr. Mortimer Spiegelman[1] of the Metropolitan Life Insurance Company the relationship between living standards and longevity. Interesting also is the fact that unmarried persons have less prospects of long life than do married persons, one of the reasons being that people in poor health usually elect not to marry. Unmarried persons, including those who are single, widowed or divorced, have slower mortality reduction than married persons.

In 1955 cardiovascular-renal diseases, cancer and accidents accounted for more than three-fourths of all deaths in the United States. In the period 1900 to 1905 these causes represented less than one-third.

Dr. Spiegelman emphasizes that advances in medicine and surgery have contributed to reductions of mortality by prolonging the lives of people with physical impairments. Diabetes is an example. All of the statistics indicate that problems of the impairments and illnesses of the aged are growing more and more significant. Improvements in health have increased the average length of married life and greatly reduced the chances that children will become orphans. Because mortality reductions have been more rapid for women, the chance that a wife will outlive her husband is greater and the lives of widows have been lengthened.

MORRIS FISHBEIN

REFERENCE

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1. *Friedlander, H. S.: The role of ataraxics in cardiology. Am. J. Card.* **1**:*395, March 1958.*
2. *Shapiro, S.: Observations on the use of meprobamate in cardiovascular disorders. Angiology* **8**:*504, Dec. 1957.*

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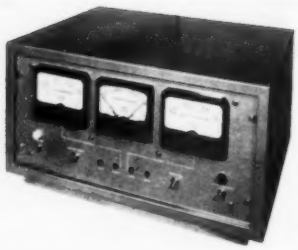

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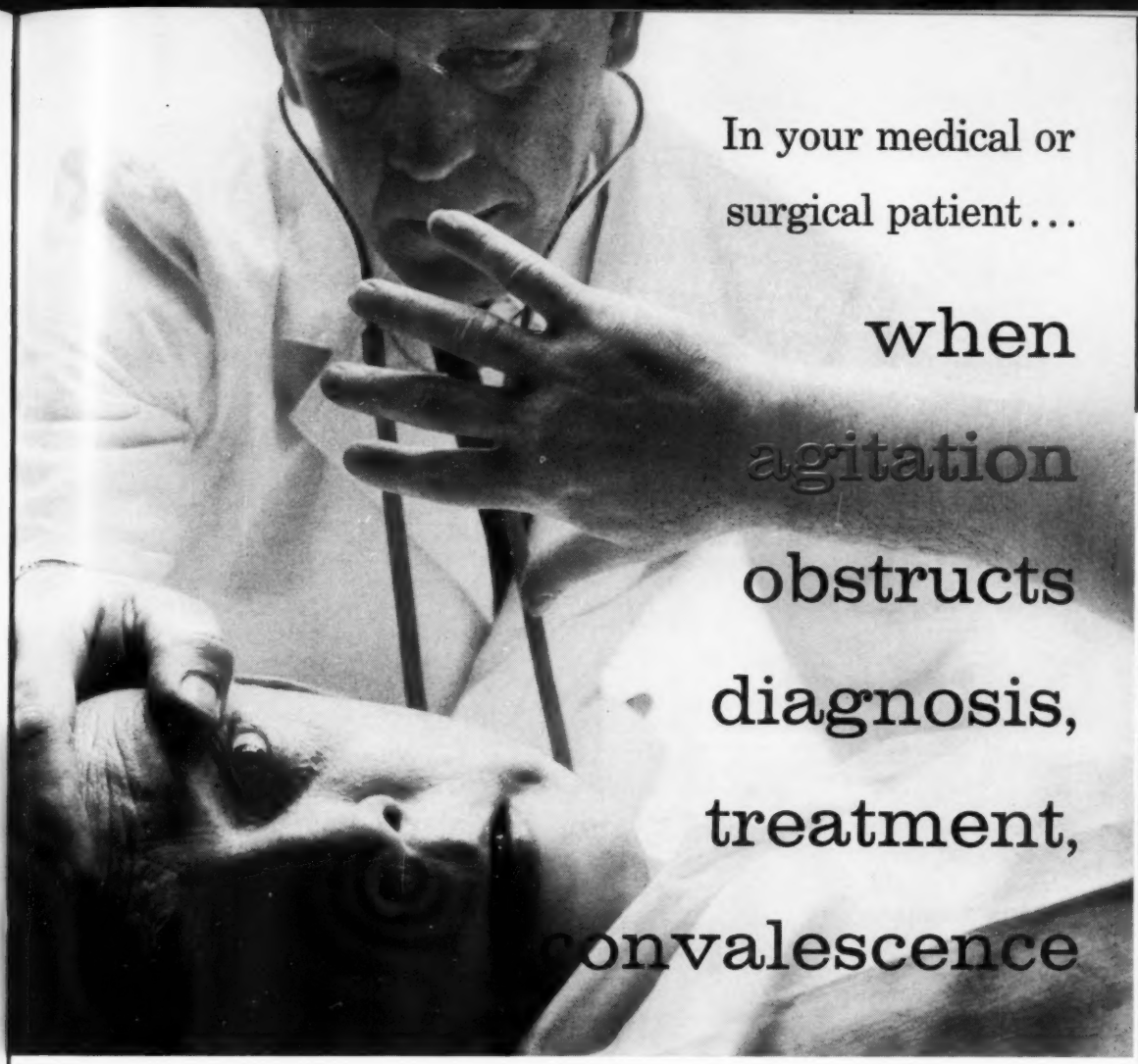
(Continued on page A-136)



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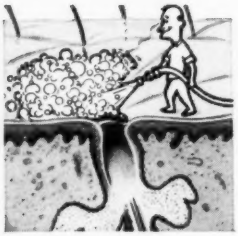

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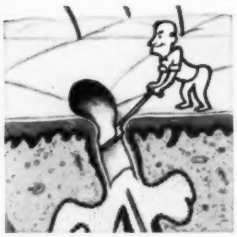

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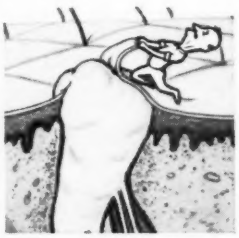

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DOSAGE AND ADMINISTRATION: 1 or 2 capsules initially, followed by 1 capsule four to six times per day.
HOW SUPPLIED: Bottles of 48.
PRODUCER: Ives-Cameron Company, Philadelphia.

• CLARIN

PURPOSE: Management of hyperlipoidemia associated with atherosclerosis.
COMPOSITION: Each tablet contains 1500 I.U. heparin potassium.
DOSAGE AND ADMINISTRATION: 1 tablet, sublingually, after meals.
HOW SUPPLIED: Bottles of 50.
PRODUCER: Thos. Leeming & Co., Inc., New York.

(Continued on page A-138)

New Milprem®-200

a new potency for greater dosage flexibility in treating the **menopause**

new
Milprem-200
200 mg. MILTOWN®
+
0.4 mg. CONJUGATED ESTROGENS (EQUINE)

for prompt relief from emotional and somatic disturbances of ovarian decline

SUPPLIED: Bottles of 60 tablets.

DOSAGE: One tablet t.i.d. in 21-day courses with one week rest periods.
Should be adjusted to individual requirements.

ALSO AVAILABLE: Milprem-400 (400 mg. Miltown + 0.4 mg. Conjugated Estrogens, equine) in bottles of 60 tablets.

Literature and samples on request

WALLACE LABORATORIES, *New Brunswick, N. J.*

CMP-7614-108

• DARANIDE®

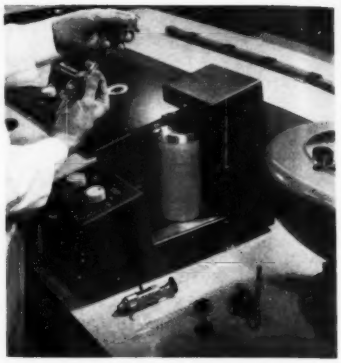
PURPOSE: Treatment of glaucoma.
COMPOSITION: Dichlorphenamide, a carbonic anhydrase inhibitor.
INDICATIONS FOR USE: Glaucoma of the following types: chronic simple (wide angle), acute congestive (narrow angle), chronic congestive, and secondary (acute phase). This product is also effective in preoperative control of intraocular tension of glaucoma and, when combined with miotics, in long-term control of excessive intraocular pressure.
DOSAGE AND ADMINISTRATION: The usual adult dosage is from 25 to 100 mg. one to three times daily, carefully adjusted according to patient's requirements.
HOW SUPPLIED: 50 mg. tablets in bottles of 100.
PRODUCER: Merck Sharp & Dohme, division of Merck & Co., Inc., Philadelphia.

• L-GLUTAVITE® 180 GM. POWDER
(New dosage and package form)

PURPOSE: Nutritional supplement and cerebral tonic.
COMPOSITION: Monosodium l-glutamate, niacin and other vitamins and minerals.
INDICATIONS FOR USE: Confusion, disorientation or depression due to decreased cerebral activity in elderly patients.
DOSAGE AND ADMINISTRATION: 1 teaspoonful in vegetable juice three times daily.
HOW SUPPLIED: 180 gm. bottles.
PRODUCER: Crookes-Barnes Laboratories, Wayne, N.J.

• GARTER BELTS

DESCRIPTION: Suitable for both men and women, these belts provide support for surgical elastic hosiery and give general all-around support. Model 671 (illustrated) is made of 4 in. wide white fabric and has a knitted elastic insert with hook-and-eye fastening. Better adjustment is made possible by three rows of eyes. Model 670 comes in 7 to 9 in. widths, is designed with a form-fashioned white elastic front, and is particularly suited to maternity wear.
PRODUCER: The Akron Truss Company, Cuyahoga Falls, Ohio.



• FRACTION COLLECTOR

DESCRIPTION: Designed for use with the Beckman GC-2 Gas Chromatograph, this device separates complex liquid or gas mixtures into chromatograph-pure fractions as small as 0.0002 cc. and collects them for analysis. The system consists of a chromatographic column with a sample range up to 5 cc. located inside the chromatograph, with the collection apparatus placed beside it. Fractions eluting from the chromatograph are condensed in fluted glass collection tubes inside a Dewar flask and then centrifuged.
PRODUCER: Scientific Instruments Division, Beckman Instruments, Inc., Fullerton, Calif.

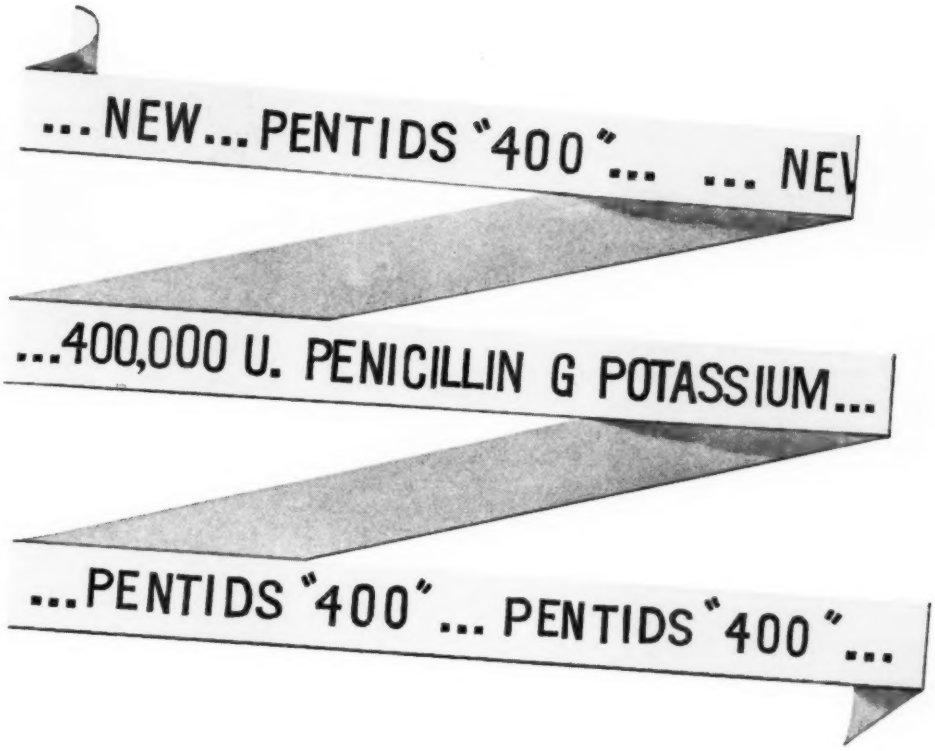
• TABLETS MI-CEBRIN® T

PURPOSE: Therapeutic or prophylactic action in vitamin-mineral deficiencies and subnutrition in adults.
HOW SUPPLIED: Bottles of 30, 100 and 1000.
PRODUCER: Eli Lilly and Company, Indianapolis.

• ILOPAN®-CHOLINE

PURPOSE: To relieve flatulence.
COMPOSITION: Each tablet contains 50 mg. Ilopan (d-pantothenyl alcohol) and 25 mg. choline bitartrate.
DOSAGE AND ADMINISTRATION: For adults, 2 tablets three times daily, adjusted according to patient's needs; for children, proportionately smaller doses according to age.
HOW SUPPLIED: Bottles of 100 and 500.
PRODUCER: The Warren-Teed Products Co., Columbus, Ohio.

(Continued on page A-140)



New convenient oral tablets . . . PENTIDS "400" . . . Economical . . . where double strength Pentids is required for treatment of severe infections due to **Staphylococcus . . . Hemolytic Streptococcus . . . Pneumococcus.** Also indicated for prevention of streptococcal infections when there is a history of rheumatic fever. PENTIDS "400" . . . Squibb Penicillin G Potassium 400,000 Unit Tablets (Buffered) . . . Dosage: 1 tablet t.i.d. without regard to meals . . . Supply: Scored tablets—bottles of 12 and 100.

For common bacterial infections, prescribe PENTIDS . . . 200,000 unit buffered Penicillin G Potassium Tablets . . . Dosage: 1 or 2 tablets t.i.d. without regard to meals . . . Supply: Scored tablets—bottles of 12 and 100.

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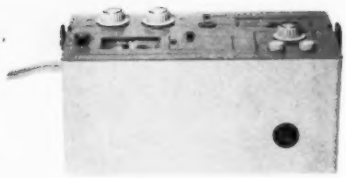
Also available as . . .

Pentids for Syrup . . . Orange-flavored, provides 200,000 units Penicillin G Potassium per teaspoonful (5 cc.), 12 dose bottles . . . **Pentids Capsules** . . . each containing 200,000 units Penicillin G Potassium, bottles of 24 and 100 . . . **Pentids Soluble Tablets** . . . each containing 200,000 units Penicillin G Potassium, vials of 12 and bottles of 100 . . . **Pentids—Sulfas Tablets** . . . each containing 200,000 units Penicillin G Potassium with triple sulfas, bottles of 30 and 100.

SQUIBB

Squibb Quality—the Priceless Ingredient



• ELECTROCARDIOGRAPH (Model 300)

DESCRIPTION: The unique features of this unit include: a two speed paper drive which provides a 100 per cent magnification of the horizontal, a switch that as it is turned from lead to lead automatically blanks the machine, grouping of all operating controls for easy management by one hand, and the use of transistors and printed circuits where possible. The tracing is standard 50 mm. width produced on standard 2.5 in. heat-sensitive paper. Finished in beige and off-white chip-proof baked enamel, the unit weighs about 29 lb. fully packed.
PRODUCER: The Birtcher Corporation, Los Angeles.

• FORMATRIX®

PURPOSE: To relieve low back pain and promote healing of fractures in osteoporosis.
COMPOSITION: Each tablet contains:

PREMARIN®	1.25 mg.
Methyltestosterone	10 mg.
Ascorbic acid	400 mg.

HOW SUPPLIED: Bottles of 60 and 500.
PRODUCER: Ayerst Laboratories, New York.

• SPENSIN PS

PURPOSE: To control diarrhea.
COMPOSITION: Each fluid ounce contains:

Dihydrostreptomycin base (as sulfate)	300 mg.
Polymyxin B sulfate	120,000 units
Attapulgite (activated)	3 gm.
Pectin	270 mg.

A special alumina gel is used as a vehicle.
DOSAGE AND ADMINISTRATION: For adults, 4 teaspoonfuls three or four times daily before meals; for infants and young children, 2 teaspoonfuls three times daily.
HOW SUPPLIED: 4 fl. oz. bottles.
PRODUCER: Ives-Cameron Company, Philadelphia.

• PREDNYL

PURPOSE: Treatment of inflammatory and rheumatoid conditions.
COMPOSITION: Each tablet contains:

Prednisolone	1 mg.
Salicylamide	5 gr.
Water-soluble citrus bioflavonoid compound	33.3 mg.
Ascorbic acid	33.3 mg.
Aluminum hydroxide	50 mg.

CAUTION: Contraindications are those of adrenocortical therapy.
DOSAGE AND ADMINISTRATION: Varying with the severity of the disease and the patient's response, the usual initial dosage is 1 to 3 tablets four times daily, preferably after meals and at bedtime; the minimum effective maintenance dosage, usually 3 to 6 tablets daily in divided doses, should be reached gradually.
HOW SUPPLIED: Bottles of 100 and 500.
PRODUCER: Arlington-Funk Laboratories, Division of U. S. Vitamin Corporation, New York.

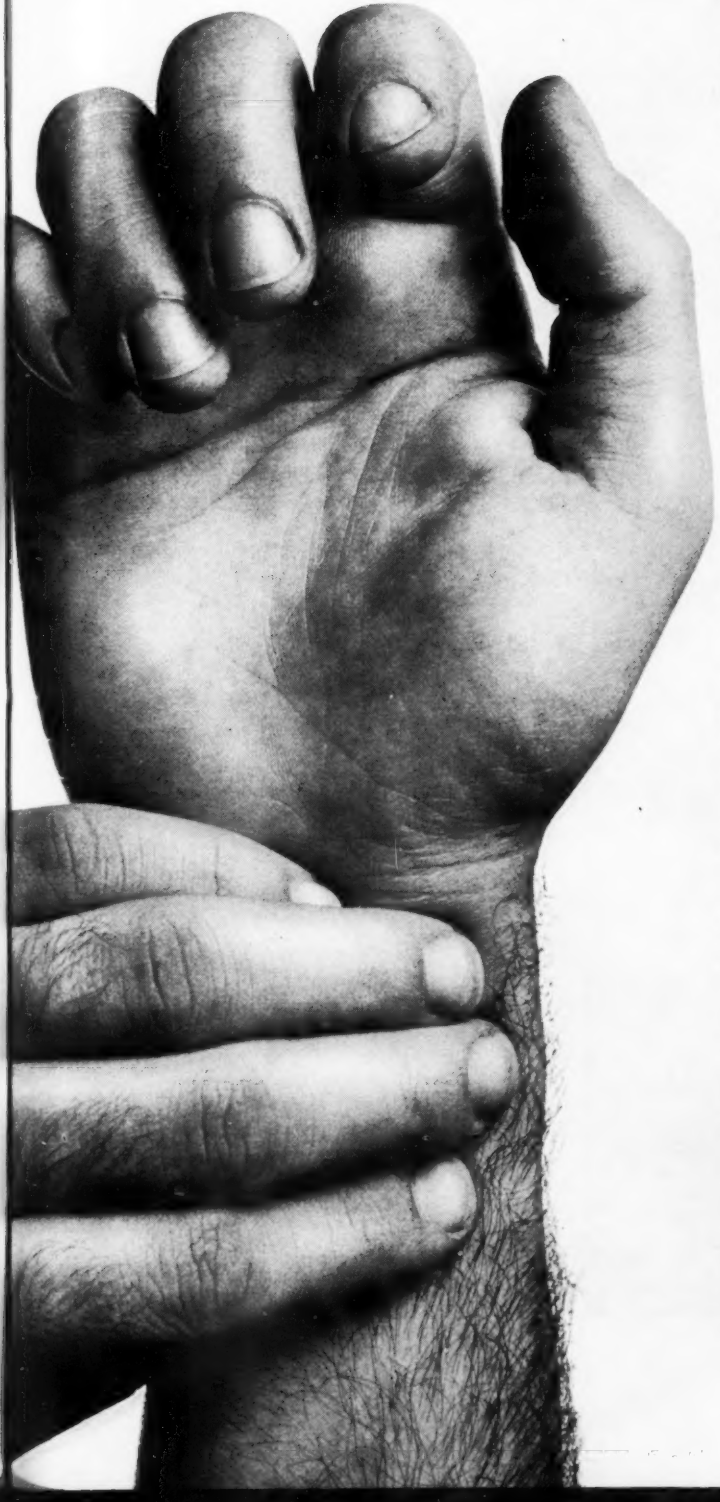
• HIGH-HUMIDITY OXYGEN TENT (Model 25)

DESCRIPTION: Regulated by simple controls, this tent provides an oxygen-rich, controlled-temperature atmosphere at 100 per cent humidity with minimal external wetting. A fog generator, which has no moving parts, is easily removed for cleaning. A clear pliable plastic tube at the lower front section of the tent facilitates filling and draining of the large-capacity reservoir and provides a visible indication of the water level.
PRODUCER: Ohio Chemical & Surgical Equipment Co. (A division of Air Reduction Company, Inc.), Madison, Wis.

• BAND-AID® CLEAR TAPE (New Package Form)

DESCRIPTION: Made of a clear plastic, this surgical tape is hyporeactive and will stretch and conform. It is waterproof, washable and has a nonglossy surface which is not visible on the skin. The tape is now available in professional rack rolls in these widths: narrow (½ in.); medium (approximately ⅞ in.); and wide (1½ in.).
PRODUCER: Hospital Division, Johnson & Johnson, New Brunswick, N. J.

(Continued on page A-142)



pulse rate up?

Serpasil slows heart rate in most cases of organic or functional tachycardia.

You'll find it especially valuable in cardiac patients whose conditions are aggravated by heart speed-up. Through a unique heart-slowing action, independent of its antihypertensive effect, Serpasil prolongs diastole and allows more time for the myocardium to rest. Blood flow and cardiac efficiency are thereby enhanced.

What's more, you can prescribe Serpasil with confidence. Therapy with Serpasil is virtually free of the dangers (heart block and cardiac arrest) heretofore encountered with heart-slowing drugs. Side effects are generally mild and can be overcome by adjusting dosage.

DOSAGE FOR TACHYCARDIA
Dose range is 0.1 to 0.5 mg. (two 0.25-mg. tablets) per day conveniently taken in a single dose. Rapid heart rate usually will be relieved within 1 to 2 weeks, at which time the daily dose should be reduced. Suppression of tachycardia often persists after therapy is stopped.

NOTE: In patients receiving digitalis or quinidine, Serpasil therapy should be initiated with especially careful observation. Serpasil is not recommended in cases of aortic insufficiency.

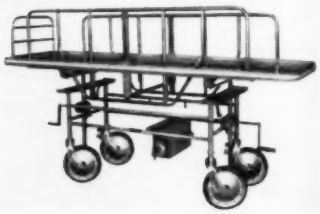
SUPPLIED: *Tablets*, 1 mg. (scored), 0.25 mg. (scored) and 0.1 mg. *Elixirs*, 1 mg. and 0.2 mg. Serpasil per 4-ml. teaspoon.

slow it down with Serpasil®

(reserpine CIBA)

2/2588MB

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York



• OXYGEN TANK CARRIER

DESCRIPTION: Designed to hold a 20 by 4½ in. tank, this carrier attaches to the Colson post-anesthesia room stretcher and makes oxygen immediately available during the potentially critical time between operating room and postanesthesia room. The attached tank allows doctors and nurses more space for maneuvering and handling the patient. The holder, available in both painted and stainless steel models, clamps directly to the lower framework of the stretcher chassis and is now available as optional equipment.
PRODUCER: The Colson Corporation, Elyria, Ohio.

• METAMINE®
(New Dosage Forms)

PURPOSE: To reduce frequency and severity of angina pectoris attacks associated with hypertension and emotional or nervous stress.
COMPOSITION: Metamine Sustained With Reserpine: Each tablet contains 10 mg. aminotrate phosphate and 0.1 mg. reserpine. Metamine With Butabarbital Sustained: Each tablet contains 10 mg. aminotrate phosphate in combination with ¾ gr. butabarbital.
DOSAGE AND ADMINISTRATION: 1 tablet on arising and before evening meal.
HOW SUPPLIED: Bottles of 50.
PRODUCER: Thos. Leeming & Co., Inc., New York.

• VI-DAYLIN® PRESSURE-PAK
(New Package Form)

DESCRIPTION: This liquid multivitamin preparation for children is now supplied in 12 oz. push-button dispensers. The liquid flows easily from a small spout, and the container's bottom is shaped so that all of the contents will be forced up the tubing. The dispenser cannot be damaged by dropping.
PRODUCER: Abbott Laboratories, North Chicago.

the new concept

Anergex*

the injectable which inhibits the **allergic response**

A single short course of injections—1 ml. daily for 6-8 days—provides prompt relief which persists for months in most patients, and can be maintained by occasional booster doses.

Anergex therapy suppresses allergic manifestations, *regardless* of the offending allergen, thus eliminating skin tests, special diets, and long drawn-out desensitization procedures.

Over 500 documented case reports[1,2,3,4] show that Anergex provided marked improvement or complete relief in over 60 per cent.

Anergex is effective in: seasonal and nonseasonal rhinitis (pollens, dust, dander, molds, foods); allergic asthma; asthmatic bronchitis and eczema in children; food sensitivities.

Available: Multiple-dose vials containing 8 ml.—one average treatment course.

literature available

MULFORD COLLOID LABORATORIES
33th & Ludlow Streets, Philadelphia 4, Pennsylvania

1. Clin. Med. 2:1009, 1955.
2. Amer. Pract. & Digest Treat. 9:1447, 1956.
3. Clin. Med. 3:1039, 1956.
4. Unpublished data.

* Reg. U. S. Pat. Off.

THE MEDICAL *Bookman*

► THE ESOPHAGUS
Medical and Surgical Management

By Edward B. Benedict, M.D., Assistant Clinical Professor of Surgery, and George L. Nardi, M.D., Clinical Associate in Surgery, Harvard Medical School, Boston. 390 pages with 108 illustrations and 16 color plates. 1958, Little, Brown & Company, Boston. $15.00.

A readable, comprehensive text in the English language on diseases of the esophagus has long been needed. The present monograph goes a long way toward filling this need. As is pointed out in the preface, the authors have not tried to cover the entire field completely. This work is merely a summary of their experiences in dealing with esophageal disease at the Massachusetts General Hospital and of their teachings at the Harvard Medical School.

The book is delightfully and clearly written, but it does not constitute a penetrating analysis of the subject. With some exceptions, each subject is covered in short discussions under the headings incidence, etiology, pathology, symptoms, diagnosis, treatment and prognosis. Controversial points are avoided, and the physiology of the esophagus is dispensed with in a few pages. The references are adequate but by no means complete.

As an introduction to the field of esophageal disease for students, general practitioners and specialists in other fields, this volume will be of inestimable value. However, the specialist in the field of thoracic and esophageal disease will find many of his questions unanswered.

F. H. E.

► DISEASES OF THE ESOPHAGUS

By J. Terracol, Professor of the Faculty of Medicine of Montpellier, Montpellier, France, and Richard H. Sweet, Associate Clinical Professor of Surgery, Harvard Medical School, Boston. 682 pages with 409 illustrations. 1958, W. B. Saunders Company, Philadelphia and London. $20.00.

Certainly the most comprehensive and up-to-date analysis of esophageal diseases, this volume is based on the second edition of Professor Terracol's original book published in 1951. In addition to having been translated, the American edition has been revised and modernized so that its content is remarkably current.

The style is extremely readable and there is little to suggest that this is primarily a translation. Every conceivable topic relating to the esophagus is covered in great detail; if anything, some sections are unnecessarily wordy and might benefit by condensation. For instance, the chapter on roentgenologic examination of the normal esophagus seems too long. The subject of esophagitis is discussed in several separate chapters, resulting in some confusion for the reader.

The bibliography is probably the most complete available, although references to English and American articles have not been translated from French to English. Unquestionably this text will be of great benefit to the surgeon and clinician; however, the medical student and general practitioner may find it less practical for their more limited requirements.

F. H. E.

(Continued on page A-164)

Persona non grata

For that most "unacceptable person"---
the one with an unwelcome cough----

CLISTIN® EXPECTORANT

- the only cough preparation containing CLISTIN Carbinoxamine Maleate—widely prescribed potent, safe antihistamine
- for coughs associated with the common cold as well as allergic or non-allergic coughs
- non-narcotic, but compatible with commonly used narcotic salts
- does not numb the mouth or upset the stomach...snappy fruit flavor...ideal for pediatric us

Clistin Expectorant clinical samples on request

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► DISEASES OF THE THYROID AND PARATHYROID GLANDS

By Bernard J. Ficarra, M.D., Research Associate in Biology (Thyroid Physiology), Post-Graduate School, Long Island University, Brooklyn. 295 pages with 131 illustrations. 1958, Intercontinental Medical Book Corporation, New York. $8.50.

In the preface the author states that this work contains information that the general surgeon interested in thyroid surgery should know. The book deals primarily with the manifestations, diagnosis and treatment of hyperthyroidism and contains a large section on thyroidectomy. There are also chapters on the history of diseases of the thyroid and parathyroids, thyroid anatomy and physiology, thyroiditis, thyroid cancer, ectopic thyroid, exophthalmos and hyperparathyroidism. The author presents much little-known but interesting information about the thyroid, and he stresses the fact that nervous states often are erroneously diagnosed as thyrotoxicosis. In the informative section on exophthalmos, he points out the poorly appreciated fact that exophthalmos may begin before or long after the actual period of hyperthyroidism.

Unfortunately, the arrangement of the text is not very logical, and the reader may find closely related information spread throughout several chapters or find certain subjects buried in unrelated chapters. For example, the section on masked hyperthyroidism appears in the chapter "Hemorrhage and pain in the thyroid gland," and the discussion of cretinism is at the end of a chapter entitled "Thiocyanate myxedema following thyroidectomy."

Many subjects, especially those dealing with the exact procedures to be followed in diagnosing the various disorders of the thyroid, are only superficially presented. The author deals primarily with hyperthyroidism and mentions the various procedures used in evaluating thyroid function, such as determining the basal metabolic rate and cholesterol level and the radioiodine tracer, protein-bound iodine and tri-iodothyronine inhibition tests. However, he does not discuss how to apply these tests in diagnosing hyperthyroidism.

The chapter on thyroiditis is somewhat incomplete. There is no discussion of the use of the radioiodine tracer or of the discrepancy between protein-bound iodine and butanol-extractable iodine in diagnosing Hashimoto's disease. Also, there is no mention of the fact that in many cases of Hashimoto's disease, the administration of thyroid will cause the goiter to decrease in size, thereby making operation unnecessary. The chapter on hyperparathyroidism does not include the specific steps to follow in establishing a diagnosis of hyperparathyroidism.

R. V. R.

► PRINCIPLES OF INTERNAL MEDICINE

Edited by T. R. Harrison, M.D., Professor of Medicine, University of Alabama Medical College, Birmingham; Raymond D. Adams, M.D., Bullard Professor of Neuropathology, Harvard Medical School, Boston; Ivan L. Bennett, Jr., M.D., Professor of Medicine, The Johns Hopkins University School of Medicine, Baltimore; William H. Resnik, M.D., Associate Clinical Professor of Medicine, Yale University School of Medicine, New Haven; George W. Thorn, M.D., Hersey Professor of the Theory and Practice of Physic, Harvard Medical School, Boston, and M. M. Wintrobe, M.D., Professor of Medicine, University of Utah College of Medicine, Salt Lake City, with 98 contributors. Ed. 3. 1,782 pages, illustrated. 1958, The Blakiston Division, McGraw-Hill Book Company, Inc., New York, Toronto and London. $18.50.

As in previous editions of this book, the editors have employed the worthwhile plan of correlating physiologic, biochemical, pathologic and psychologic findings with the clinical manifestations of disease. The entire text has been brought up to date and many of the sections have been rewritten.

There is a new chapter on heritable diseases of connective tissue, including Marfan's, Hurler's and the Ehlers-Danlos syndromes, osteogenesis imperfecta and pseudoxanthoma elasticum. A new section on dermatology includes brief discussions of some of the more common dermatologic disorders. An extensive table of normal laboratory values also has been added.

With this new edition, this text continues to be one of the outstanding works in its field. The editors are to be commended in meeting the standards of excellence which were set by the previous editions.

R. V. R.

(Continued on page A-166)

in peptic ulcer

KOLANTYL: with 4 needed healing actions

1. **vital antispasmodic action**—BENTYL—Merrell's fast, safe antispasmodic . . . relieves spasm-pain promptly, without atropine-like side effects. 2. **balanced acid-neutralizing action** — magnesium oxide and aluminum hydroxide—prompt, long-lasting relief . . . no laxation, no constipation. 3. **demulcent action**—Methylcellulose—soothing protective coating covers ulcerated area, promotes healing. 4. **antienzyme-antipepsin action**—Sodium Lauryl Sulfate — effectively curbs necrotic effects of pepsin and lysozyme . . . prevents further erosion. **Dosage**—Gel: 2 to 4 teaspoonfuls every 3 hours, or as needed. Tablets: 2 tablets (chewed for more rapid action) every 3 hours, or as needed. **NON-CONSTIPATING . . . NON-LAXATING**

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THE WM. S. MERRELL COMPANY
New York • CINCINNATI • St. Thomas, Ontario
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► THE PRACTICE OF NUCLEAR MEDICINE

By William H. Blahd, M.D., Chief, Radioisotope Service, Veterans Administration Center, Los Angeles, Franz K. Bauer, M.D., Chief, Outpatient Services, Los Angeles County Hospital, and Benedict Cassen, Ph.D., Chief, Medical Physics Section, Atomic Energy Project, University of California School of Medicine at Los Angeles. 407 pages, illustrated. 1958, Charles C Thomas, Springfield, Illinois. $12.50.

Despite the newness of the synthetic radioisotopes, an overwhelming amount of material on the subject already has been published. This includes a number of books directed toward the biologic sciences. Early texts stressed physiologic and biochemical phenomena; then a number of "medical" books appeared which emphasized the physical principles of radioactivity.

The trend is changing. Books are beginning to appear in which the medical uses of the radioisotopes are described in detail, with only a necessary minimum of basic science material included. This is such a book. It is obviously written directly from the personal experience of the authors, who are already well known for their pioneering methods of scintiscanning. This technic consists of recording on paper various intensities of radioactivity as a scanning detector moves back and forth over some area of the body. That this text should emphasize the scanning method is not surprising.

The book is divided into sections on physical principles, diagnostic methods, therapeutic applications, and the laboratory and instruments. Appendixes cover the physical decay factors of commonly used radioisotopes, a nomogram for determining the area of the body surface, the desirable weights for adult men and women, and a list of the commercial sources of compounds labeled with radioisotopes.

The discussion of the fundamentals of radioactivity is unusually lucid and will particularly please the physician because of the authors' announced nonmathematical approach. The only significant exception is in the calculation of the radiation dose to tissues. Since this is primarily in the realm of the physicist and the radiologist, both of whom are trained in the mathematics involved, it need not create any problem for the general reader.

The section on diagnosis includes all the commonly used and established radioisotopic tests. Each test is described in technical detail, although the physiologic principles on which the tests are based are outlined only briefly.

Newer diagnostic tests are presented in sufficient detail to be performed by those not now familiar with the methods. These include the test of liver function using radioiodine-labeled rose bengal, absorption of radioiodine-labeled protein or fat in pancreatic insufficiency, and the test of renal function using radioiodine-labeled iodopyracet (DIODRAST®). Almost all the diagnostic tests that have been proposed at one time or another are at least mentioned.

In the section on therapeutics the authors describe the use of radioiodine in hyperactive or malignant disease of the thyroid gland and in euthyroid patients with cardiac disease, the use of radiophosphorus in polycythemia vera and other hematologic diseases, the use of radioactive colloids such as chromic phosphate and gold in treating cavitary malignant tumors, the implantation or surface application of isotopes and teletherapy with radioactive cobalt.

One should obtain a copy of this book if for no other reason than to read the introduction, in which Dr. Paul Aebersold, of the United States Atomic Energy Commission, reviews in a delightful manner the history of the radioisotopes.

C. A. O.

► ESSENTIALS OF GYNECOLOGY

By E. Stewart Taylor, M.D., Professor and Head, Department of Obstetrics and Gynecology, University of Colorado School of Medicine, Denver. 502 pages with 343 illustrations, 4 in color. 1958, Lea & Febiger, Philadelphia. $12.00.

Approaching his subject with the needs of undergraduate medical students in mind, the author does not attempt to answer questions on a postgraduate level. One is impressed by the lack of new material throughout the book, especially in the illustrations, almost all of which have been taken from published sources.

It is noted that the author suggests alcohol and ether as a fixative for Papanicolaou's smears. Many practitioners, realizing the explosive danger of ether, have eliminated it from the fixative without affecting the subsequent smear staining.

E. A. B.

(Continued on page A-168)

does the specific job superbly well

new

POLARAMINE*

dextro-chlorpheniramine maleate

REPETABS®

daylong or nightlong relief

ASSURE UNEXCELLED ANTIHISTAMINIC PROTECTION

one REPETAB in the morning · one REPETAB in the evening

POLARAMINE REPETABS, 6 mg., bottles of 100 and 1000.
Tablets, 2 mg., bottles of 100 and 1000.

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► PROGRESS IN ARTHRITIS

Edited by John H. Talbott, M.D., Professor of Medicine, and L. Maxwell Lockie, M.D., Head, Division of Therapeutics, University of Buffalo School of Medicine, Buffalo, New York. 456 pages, illustrated. 1958, Grune & Stratton, Inc., New York and London. $12.50.

The title of this book is misleading. Actually, the work is more an anthology of current beliefs and practices in the field of rheumatic diseases than a discussion of recent advances in the diagnosis and treatment of these diseases.

The book consists of 27 papers dealing with various aspects of rheumatic disease. Each paper, prepared by one or more of the 34 contributors, is associated with the other chapters only as it is one of a collection. This has resulted in a fair amount of overlapping, particularly in the two chapters concerning osteoarthritis and the two concerning rheumatic fever. This arrangement also has left some lacunae. Thus, there is no mention of the arthritis associated with psoriasis. Certain chapters, it is true, analyze recent advances in basic research. These analyses vary in complexity, some being simplified summaries, such as those on the serologic reactions in rheumatoid arthritis and on induced connective tissue syndromes. Others are more comprehensive evaluations of current theories and problems in such special fields as fibrinlike substances. None of these analyses is excessively technical; they will primarily interest one who has been unable to keep fully up to date with the technical advances in arthritis in the past few years.

Several chapters dealing with newer therapeutic measures, such as the steroids BUTAZOLIDIN® and BENEMID®, are good summaries of current practice but do not contain much which is new. Still other discussions are reviews of entire clinical entities, such as juvenile rheumatoid arthritis, Felty's syndrome, rheumatoid spondylitis, shoulder-hand syndrome, Dupuytren's contracture and osteoarthritis. These chapters also are largely syntheses of current thought. The sections on juvenile rheumatoid arthritis, the treatment of rheumatoid arthritis, the hand in the diagnosis of arthritis, rehabilitation in arthritis, and osteoarthritis are especially good. In addition, there is a very interesting and completely unexpected chapter on the medicolegal aspects of trauma in the joints and spine.

The volume is an excellent, up-to-date reference for the internist or general practitioner who deals with patients with rheumatic diseases and who is interested in a concise expression and authoritative simplification of current concepts and trends in the management of these diseases. The volume will be less useful to specialists in rheumatic disease, although even they will appreciate the succinct descriptions of recent technical advances.

J. G. M.

► ORR'S OPERATIONS OF GENERAL SURGERY

By George A. Higgins, M.D., Associate Professor of Surgery, and Thomas G. Orr, Jr., M.D., Associate in Surgery, University of Kansas School of Medicine, Kansas City, Kansas. Ed. 3. 1,016 pages with 1,990 illustrations. 1958, W. B. Saunders Company, Philadelphia and London. $20.00.

Because a surgeon is always concerned with technic, a book such as this is extremely practical. The present edition of this text has been considerably revised; several new chapters have been added, and some have been omitted and their subject matter incorporated into others. From the standpoint of technic, it is extremely well illustrated and up to date. The authors have drawn freely from the work of others, including some reproductions of illustrations.

The bulk of the material covers well-established surgical technics, with basic science, physiology and statistical data kept to a minimum. In many instances several well-known procedures for the same operation are presented.

Wound healing, an extremely important problem in considering surgical maneuvers, is discussed rather extensively. Surgery of the major body divisions is described, beginning with head and neck and continuing with the throat and respiratory system, the circulatory, digestive, nervous, endocrine, genitourinary and female reproductive systems and bones and joints. A separate section is devoted to hernia.

An outline or index of the contents precedes each chapter. Following are several paragraphs on general considerations and, frequently, a discussion on dangers and safeguards. The remainder of each chapter deals with the actual technic.

Y. S.

(Continued on page A-170)

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► THE YEAR BOOK OF ENDOCRINOLOGY (1957-1958)

Edited by Gilbert S. Gordan, M.D., Associate Professor of Medicine, Chief of Endocrine Clinics, Department of Medicine, University of California School of Medicine, San Francisco. 381 pages with 79 illustrations. 1958, The Year Book Publishers, Inc., Chicago. $7.50.

Annually "The Year Book of Endocrinology" presents abstracts of recently published important articles on various phases of endocrinology. As the editor points out, the volumes of this series are not meant to be textbooks of endocrinology or to cover all fields of endocrinology; however, a special effort is made to include important articles which appear in journals not generally available to most physicians. It is this policy which makes each edition of this volume so helpful to anyone interested in the new developments in this specialty.

The present edition contains a special article on the current endocrine therapy of mammary cancer by George C. Escher of the Sloan-Kettering Institute. This timely contribution will be welcomed by those who care for patients with metastatic carcinoma of the breast.

R. V. R.

Books received are acknowledged in this department. As space permits, books of principal interest to our readers are reviewed more extensively.

Emergency Treatment and Management. By Thomas Flint, Jr., M.D., Director, Division of Industrial Relations, Permanente Medical Group, Oakland and Richmond, California. Ed. 2. 539 pages. 1958, W. B. Saunders Company, Philadelphia and London. $8.00.

Medical Sociology; Theory, Scope and Method. By Norman G. Hawkins, Ph.D., Assistant Professor of Medical Sociology, University of Texas Medical Branch, Galveston. 290 pages. 1958, Charles C Thomas, Springfield, Illinois. $6.75.

How to Live With Diabetes. By Henry Dolger, M.D., Chief, Diabetes Clinic, Mt. Sinai Hospital, and Bernard Seeman, New York. 192 pages. 1958, W. W. Norton & Company, Inc., New York. $3.50.

Human Dissection; Its Drama and Struggle. By A. M. Lassek, M.D., Department of Anatomy, Boston University School of Medicine, Boston. 310 pages, 16 illustrations. 1958, Charles C Thomas, Springfield, Illinois. $6.50.

Advances in Electrocardiography. Edited by Charles E. Kossmann, M.D., Associate Professor of Medicine, New York University College of Medicine, New York. 280 pages, illustrated. 1958, Grune & Stratton, Inc., New York and London. $9.75.

Radiation Protection. By Carl B. Braestrup, Director, Physics Laboratory, Francis Delafield Hospital, New York, and Harold O. Wyckoff, Chief, Radiation Physics Laboratory, National Bureau of Standards, Washington, D. C. 361 pages, illustrated. 1958, Charles C Thomas, Springfield, Illinois. $10.50.

Clinical Obstetrics and Gynecology. A quarterly book series. Toxemias of Pregnancy. Edited by Louis M. Hellman, M.D., Professor of Obstetrics and Gynecology, State University of New York, Downstate Medical Center, Brooklyn. Fibromyomas of the Uterus. Edited by Robert A. Kimbrough, M.D., Professor of Gynecology and Obstetrics, University of Pennsylvania School of Medicine, Philadelphia. Vol. 1. No. 2. 1958, Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York. $18.00 per year.

An Introduction to the Study of Experimental Medicine. By the late Claude Bernard. Translated by Henry Copley Greene, A.M. 226 pages. 1958, Dover Publications, Inc., New York. $1.50.

Doctor Squibb. By Lawrence G. Blochman. 371 pages. 1958, Simon and Schuster, New York. $5.00.

Biology of Neuroglia. Compiled and edited by William F. Windle, Ph.D., Chief, Laboratory of Neuroanatomical Sciences, National Institutes of Health, Bethesda. 340 pages with 78 illustrations. 1958, Charles C Thomas, Springfield, Illinois. $8.50.

The Physiology and Pathology of the Cerebellum. By Robert Stone Dow, M.D., Associate Clinical Professor of Medicine, University of Oregon Medical School, Portland, and Giuseppe Moruzzi, M.D., Professor and Head, Institute of Physiology, University of Pisa, Pisa, Italy. 675 pages with 185 illustrations. 1958, The University of Minnesota Press, Minneapolis. $12.50.

Hospital Planning for the Anesthesiologist. American Lecture Series. By William H. L. Dornette, M.D., Professor of Anesthesiology and Head of the Department, University of Tennessee College of Medicine, Memphis. 119 pages, 31 illustrations. 1958, Charles C Thomas, Springfield, Illinois. $5.25.

Progress in Medical Virology. Edited by E. Berger, Basel, Switzerland, and J. L. Melnick, Houston. Vol. 1. 304 pages with 44 illustrations. 1958, Hafner Publishing Co., New York. $11.50.

Callander's Surgical Anatomy. By Barry J. Anson, Ph.D., Chairman, Department of Anatomy, and Walter G. Maddock, M.D., Edward S. Elcock Professor of Surgery, Northwestern University Medical School, Chicago. Ed. 4. 1,157 pages with 1,047 illustrations. 1958, W. B. Saunders Company, Philadelphia and London. $21.00.

Radioactive Isotopes in Clinical Practice. By Edith H. Quimby, Sc.D., Professor of Radiology, Columbia University College of Physicians and Surgeons, Sergei Feitelberg, M.D., Director, Physics Department, and Solomon Silver, M.D., Chief, Thyroid Clinic, Mount Sinai Hospital, New York. 451 pages with 97 illustrations. 1958, Lea & Febiger, Philadelphia. $10.00.

The Waking Brain. By H. W. Magoun, Ph.D., Department of Anatomy, University of California School of Medicine at Los Angeles. 138 pages, 55 illustrations. 1958, Charles C Thomas, Springfield, Illinois. $4.75.

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NOVEMBER 1958

The Tax Law Was Again Changed In 1958 - by an Act which had for its stated purpose "to correct unintended (tax) benefits." That is tax loophole-closing language. But in legislative process from House Ways and Means Committee to Senate Finance Committee, and from the House to the Senate, many loophole-closing proposals were eliminated.

Here are some areas in which taxpayers sought savings opportunities in the past which were not barred by 1958 Code changes.

Family Converts Ordinary Income Into Capital Gain - Here's what a professional man did in the past. His mother had a life interest in income-producing property. He had a remainder interest -- was to get the property on her death. Income from the property received by the mother was ordinary income, subject to full tax. The mother sold her life interest to her son. She got cash value for her income interest immediately in hand. She was taxed at favorable capital gain rates on the sale. The son then claimed that he bought a depreciating interest -- his mother's life interest in the property. As offsets against income he received from property he took amortization deductions, i.e., annual deduction found by dividing the sum he paid his mother by the number of years of her life expectancy.

The effect of this sale-purchase was to convert ordinary income into capital gain within the family. The mother had to pay a current capital gains tax. But the son, now owning all the interest in the property and entitled to its income, was able to tax-free that income by offsetting amortization deductions. This loophole was considered by Congress but tabled for future study.

Cutting Tax On Family Income By Multiple Trusts - Each trust constitutes a separate taxpayer with its own exemption. Income for a minor child beneficiary can be accumulated within a trust at a very low tax rate. And the tax advantages of a trust can be increased by use of multiple trusts. Even on very sizable gifts to a minor, it is possible to keep tax low on high income. The donor makes his gift in trust, but he gives to several trusts created for the same child.

Back in 1956, one father, engaged in a $3.5 million building venture, shifted income and tax on it by massive use of family trusts. He brought his children in as partners in the building venture by setting up 27 separate trusts for them. On a smaller scale, other parents have utilized multiple trusts to reduce taxes. A proposal to eliminate the added tax advantage secured by multiple trusts was considered by Congress, but was tabled for future study.

Get Maximum Value Out Of Long-Term Losses - A combination of professional and investment income places a doctor in the 65% tax bracket. So far in 1958, he has realized $5,000 short-term security profits. He also liquidated some weaker security holdings at a $5,000 long-term loss. He still holds securities on which he has $5,000 unrealized long-term gains, but he thinks it advisable to take those gains now as a protection against any market drop. If he does, his $5,000 long-term losses will offset the $5,000 long-term gains, leaving him with $5,000 fully taxed short-term profits. On those fully taxed profits, he will pay a tax of $3,250, keep a net profit of only $1,750 from all his security transactions. But he can increase the amount he will keep from his security transactions to $3,750 without any added risk.

He makes a short sale of the securities on which he has unrealized long-term gains. Early next January, he closes out his short sale by delivering the long-term securities he now holds. His long-term profits thus are realized in 1959. On those profits he will keep $3,750 after taxes. This year, his $5,000 realized long-term losses offset in full the $5,000 realized short-term gains, leaving him with no tax to pay on this year's security transactions. By the short-sale method, he not only shifted taxable gain to the succeeding year, but it allowed him to keep $3,000 more from his security transactions.

A proposal to bar this use of a short sale never got beyond the proposal stage.

Buying Depressed Real Estate Subject To High Mortgage - can yield tax-free income with capital gain potential. Real estate originally was mortgaged up to maximum debt value. Due to local real estate changes, value of the property has dropped to $70,000 -- or $10,000 less than the $80,000 remaining mortgage debt. The investor believes that the depressed value for the property is only temporary and that the property has an excellent chance of again appreciating in value. Because mortgage debt exceeds current value of the property, he is able to purchase the property for a very nominal sum. He buys the property subject to the mortgage, but he does not personally assume the mortgage debt.

In figuring tax cost for depreciation purposes, the investor is allowed to take into account the big mortgage debt for big deprecia-

tion deductions. Rents from the property as a result are tax sheltered, even tax free in part. The investor gets rental income which is partly tax exempt. If his judgment of real estate values later turns out to be overly optimistic, investor will lose his small capital investment on foreclosure. So he risks little. But if his judgment of real estate values is vindicated and the property jumps in value, he can get a capital gain return by selling the property.

A proposal to limit depreciation deductions under those circumstances was never acted upon.

Canadian Mutual Funds Promise Capital Gain Return - These Canadian investment companies owned by Americans follow an investment policy of retaining all profits -- both current return and security gains. So the American investor has no current investment return on which a U. S. tax could be levied. Under Canadian tax law, these funds are tax sheltered. Any tax due Canada is a minimum tax, if any is due at all. This favorable tax treatment promises an equity value buildup at a rapid rate within the fund. Such values in turn are directly reflected in the value of the shares held by the American investor. After holding them for more than 6 months, he can realize any profit by selling his shares at capital gain rates.

A proposal was made to take this extra tax shelter out of Canadian mutual funds, but Congress tabled the proposal without acting on it.

* * * *

Private Pension Plan For The Doctor - working part-time for tax-exempt organization was given partial approval by Congress this year. From private practice, a doctor had income of $35,000. Rather than taking any compensation for lectures at a university, he waived $6,000 salary otherwise due. On top of his other income, he'd keep less than half of any salary payment. The university invested the $6,000 waived salary in a retirement annuity for the doctor. Result: Doctor did not have taxable income from the annuity until annuity payments started after retirement, when he was in a much lower tax bracket.

Changed law would limit this practice. On such premium payments, the doctor avoids current tax only to the extent of an annual exclusion allowance. The exclusion allowance is 20% of salary actually paid the doctor times the number of years he has worked for tax-exempt organization, reduced by any past premium payments which did not result in taxable income to him. While change in law now contains a limitation, it still permits some tax benefits.

A doctor accepts a lecturing post for which fair compensation is $6,000 a year. He contracts to receive $5,000 in current salary, with $1,000 invested in an annuity for him. On the salary actually paid him, the doctor would have to pay a tax. But since the $1,000

premium payment is within the 20% limitation (20% of $5,000) he'd owe no additional tax until annuity matured.

Tax Aid In Form Of Increased Medical Deduction - now is allowed older patient under changed tax law. Devoted husband and wife are in their late 60s. The wife suffers a serious disability which is compounded by her age. Although the husband's income has dropped considerably since his retirement, he willingly incurs expenses for the best medical treatment available in behalf of his wife. During the year, medical expenses for the couple run $10,000. Full deduction for such medical expenses would go a long way toward lightening husband's expenses. But in the past, such couple could not deduct more than $5,000 of their medical expenses.

This was not an unusual situation for the older couple. Limitation on tax deduction was particularly hard on them. Congress recognized that this year. Now if a taxpayer, 65 or more, becomes disabled, ceiling on his medical expense deduction is $15,000. The same is true for medical expenses of his spouse if she is 65 or more.

* * * *

More Tax Returns Will Be Audited In The Future - but audit procedure will be made easier on taxpayers. The Treasury is streamlining its audit procedure, which will result in an increased number of audits, but also make them less of an ordeal for taxpayers.

In the past, taxpayer called in for an audit might be required to bring in all his tax records, without any indication from the Treasury as to which items on his return were being checked. Under new policy, taxpayer called in for an office audit will receive a letter which will include a check-list covering such items as travel, dependency exemption, contributions, interest expense, etc. The list will be checked by Treasury to indicate which items it wants substantiated. Taxpayer then will only be required to bring in tax records pertaining to those items.

The chances that a doctor's return would be audited were always better than average. The majority of doctors are in private practice. Treasury has conceded that it pays more attention to returns filed by taxpayers showing a substantial amount of income from self-employment than it does to those returns filed by employes, bulk of whose income comes from salary. The new audit procedure makes it even more likely that the return of the doctor will be audited. Warning: While fewer items on the return will be subject to a check, there is even more of a premium placed on keeping good tax records. If those items initially checked cannot be substantiated, danger exists that taxpayer will be subject to a full-fledged audit covering his entire return.

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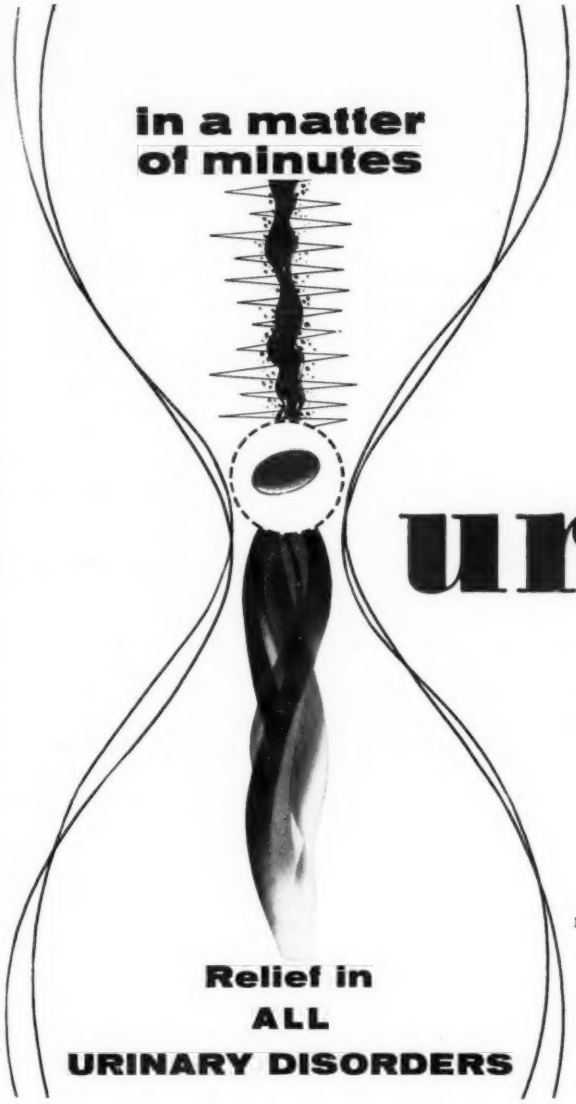

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1. Strauss, B., Clin. Med., Vol. IV, No. 3, 1957

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DR. Pepys' Pages

Personal Diary
and Observations on
Medical Life
by MORRIS FISHBEIN, M.D.

Sept. 3—All day at the desk and in the evening by American Airlines to New York, reading en route "The Bramble Bush," by Charles Mergendahl, which is a vicious tale of medical life in and about Falmouth, with all of the persons heavily involved in sexual intrigues. A case of Hodgkin's disease is depicted horribly until the doctor performs euthanasia; the chief nurse has nymphomania. The blurbs that compare this to "Peyton Place" do that sordid novel an injustice.

Sept. 4—To Doubleday for conferences on my publishing projects. At noon to the Lotos Club, where came an assemblage to launch *World-Wide Abstracts of General Medicine*. Here were talks by Elmer Bobst, Len Scheele and Von Tongeren; and old Pepys introduced Bill and Stanley Lasdon, Peter Warren and Ellwood Douglass, and then the magazine. Here were Marguerite Clark, Robert Potter, McCormick of United Press, John Barbour of Associated Press, Roland Berg, and representatives of the drug and the advertising industries. Then at night with Elmer Bobst, Bill and Milton Lasdon and Sylvia to "21" for further celebrations.

Sept. 5—For luncheon came Bill Craft and his beautiful lady and the two gorgeous children; in the afternoon came Paul Lapolla with a new book on home nursing. Then at night with Peter Warren and Anneke, Teresa Cohen of POSTGRADUATE MEDICINE, and Von Tongeren to the Starlight Roof and heard Tex Beneke and the Glen Miller orchestra of soloists play what old Pepys still thinks is raucous music.

Sept. 6—At the desk and in the afternoon at mathematics with Soroko, not doing so well. Then Nick Dontas came over from Philadelphia to tell of his work with Charles Bailey, and all to the Black Angus for the well-known steaks.

Sept. 7—Early to the airport for a flight to Boston. Here to the China House for a luncheon and then to dedicate the Washingtonian Hospital for service to alcoholic addicts. Here were Dr. Thimann, Charles Haney, Judge Mattola and the sister of Congressman Tinkham, who aided the endowment. In the afternoon back home on the plane and so improved in mathematics at this altitude that Soroko was devastated.

Sept. 8—To breakfast came Stan Henwood for a conference on international meetings. To luncheon with Therese Rivers, Laura Runyon and Mistress Pepys; saw also Basil O'Connor, Rivers, Glasser and Barrow, and so had opportunity to wish them farewell. Then to the airport to embark on Pan American, waving adieu to Mark and Rose. En route also to Rome were John McKeen and Rowan of Pfizer. Read en route "The Best of Everything," by Rona Jaffe, which tells of the young typists and stenographers who come to New York in search of fame and fortune and husbands—but most of them do not find same. So slept perfectly while the plane winged its way to Paris and on to Rome.

Sept. 9—In Rome at the airport, where Signor Marino, who conducts the airport, saw us rapidly through the formalities. Old Pepys was photographed singly and also with McKeen, Marino-Zuco and Del Torto. Then all to the Hassler, and at dinner were William Dameshek of Boston and his lady, here for the International Congress on Hematology, where Dameshek and Wintrobe received the Ferrata award.

Sept. 10—Early with Dr. Pizzeti to the great exhibition halls, where were meetings of the congresses on hematology and on neuropsychopharmacology. Here met Gino Frontali, who holds on Saturday a special symposium on pediatric hematology. Here met also Drs. Paule of Toledo and Singleton of Akron, and the Americans were present in great numbers. In the afternoon with Romola Vicchi to make some purchases. At luncheon saw Cecil Watson, looking most fit, dining with his wife and his mother, who, like all the ladies, greatly enjoy a visit to Rome. At night came Marino-Zuco and Del Torto and the ladies, and all to the gorgeous summer place called the Villa Fiorio in Grottaferrata, which was formerly the pleasure palace of King Farouk and is complete with swimming pool, antique furniture and tantalizing music.

Sept. 11—At noon to the Grand Hotel for a meeting of the American Club. Here Admiral Brown of the Sixth Fleet spoke of his mission in the Mediterranean, which was to maintain

(Continued on page A-217)

peace. My host was David Corcoran, who represents Winthrop in Italy, and we spoke of his brother Tommy, whom I met in 1937 when the American Medical Association was being teased by Thurman Arnold. Here also were Congressman Celler, who was giving interviews about foreign relations. Also there was Ambassador Zellerbach, and old Pepys sat between Lieutenant General Rogers, who is inspector general of our army, and Tullia Gray, who heads Pan American Airways in Italy, and all on the dais were introduced. After luncheon, was greeted by Bill Norcia, who represents Parke, Davis & Company, and Dickman, whom I met with my brother Harold in Berlin in 1948. In the evening with Mistress Pepys to the Ninfeo di Villa Giulia, which was the summer residence of a former Pope, and saw some classical ballets performed in the open air, the choreographer being Colleoni and the premier danseuse Rosanne Sofia-Moretti. The air was cold, the dancers stiff, the ballets pretentious, and we left before the last one came on.

Sept. 12—In the morning again to the neuropsychopharmaceutic conferences, and heard Dr. Ayd of Baltimore review experiences with a variety of phenothiazines. The results were inconclusive, and, when Dr. Ayd finished, a discussant asked if there was such a thing as a standard patient. At noon came Professor Bendandi, who is associated with Professor Valdoni in the Clinica Chirurgica of the University of Rome. We talked in detail of the next International Congress of the International College of Surgeons, which will be in May 1960. In the evening with Riccardo and Romola Vicchi to the Ristorante Fontanelle, about a mile down the via Condotti, and the food was luscious.

Sept. 13—Early to drive to the new Boys' Town of Italy, which is for problem boys. Monsignor Carroll-Abbing showed us the work on ceramics, carpentry, tools and administration and the medicosocial-psychologic clinic. Surely this deserves great support as a first step in meeting juvenile delinquency. So ate with all the boys a fine fare of *minestrone*, veal, fruit and cheese, with a wine for which they themselves grow the grapes, and we saw the casks and the wine cellars. In the evening with Professor Marino-Zuco, Pietrogrande, Del Torto and the ladies to the new Passeto, which is redecorated. Here were the elite of Rome and the movie colony, with startling blondes accompanied by sleek, dark escorts, but old Pepys still prefers brunettes. Especially recommended: *Melon prosciutto, scallopini con funghi* and *soufflé vanille*—with a blonde wine that produces joy and hilarity.

Sept. 14—Early came Professor Caronia to say farewell. Then to the airport, where were friends bearing flowers and urging a quick return, like the coins in the Fountain of Trevi. After a quick flight, greeted warmly at the Hotel Du Rhone in Geneva. In the afternoon drove about the city, renewing the joys of the historical buildings and viewing a great display of roses in the Gardens of Favre, and ended the day by dining on fondue, lovingly prepared by La Mere Royaume.

Sept. 15—About the city, visiting Cooks' and Messieur Fatio, and purchased from him a watch which has a built-in flashlight that illuminates the dial, made by Ernest Borel. By train to Baden-Baden, reading en route "Exodus," a new and magnificent novel of the history of Israel, written by Leon Uris, who wrote "Battle Cry." It belongs high on the list of the best of 1958. So to the Brenners Park Hotel, surrounded by gardens, and found rooms and service which are the delight of luxury.

Sept. 16—As unusual, slept late and read in bed until noon. Then to the shops and for luncheon at the Café König. In the afternoon to a concert in the Kursaal, and, after a fine dinner in the hotel, to the casino, playing a peculiar kind of roulette and coming home with three marks' profit.

Sept. 17—Walked among the shops of Baden-Baden and visited Dr. Friedrich Thieding, who is the first *vorsitzender* of the Hartmannbund, the organization that deals with political affairs and social problems for the German medical profession. They are demanding a reform of the social security organization. They desire to take it away from collectivism and to restore the personal relationship between doctor and patient. In the afternoon driving along the *Autobahn* to Frankfurt in about two and one-half hours, and there viewed the tremendous area that houses the American military installations, which have more than 50,000 personnel, according to our guide. Visiting also the china and toy shops and then by KLM to Amsterdam, meeting Cauverien and his lovely lady at the Amstel. And suddenly appeared Charles Singer, my neighbor in Chicago, and it was like old-home week.

Sept. 18—To the Hotel Europa for luncheon with Von

(Continued on page A-218)

Eugen, director of Wetenschappelijke Uitgeverij, which is a publishing company, C. van der Waerden, director of *De Arbeiderspers*, which is a newspaper, and the directors of *Excerpta Medica*. In the afternoon to confer with 20 editors and subeditors of the staff about the qualities of abstracting, and in the evening to dine with the Cauveriens and Pam von Tongeren at Dikker and Thijs, which is the best of Amsterdam.

Sept. 19—For a meeting with Professor Woerdemann, whose lady now lies seriously ill; he is sorely pressed with this and with his duties as chancellor of the University of Amsterdam, and all have great sympathy for him. In the afternoon a long conference with the editors of the various subsections—Huizinga, Vinken, Duvall and others. At night to dine with friends at the Amstel.

Sept. 20—In the early morning driving to Brussels in about three hours for a last view of the "Expo," as they call it. Here the American and Russian exhibits are still most crowded, but the Americans now offer a gorgeous style show, and hundreds line up to buy ice cream cones. The Russian souvenir sales are diminishing as an attraction. So with the Cauveriens lunched at the top of the Atomium—100 m. in the air—with wonderful food and atmosphere. Then took the ride around the grounds and visited the shops of the international area and the inspiring Israel exhibit and drove home late, stopping at the Café Erasmus in Rotterdam for dinner.

Sept. 21—Mistress Pepys visits an artist in a boat on the canal and purchases an artistic iron horse, while old Pepys catches up on the correspondence. Then by KLM to Paris in one hour and to the Ritz. In the twilight walked along the Champs Élysées, finding Paris perfectly quiet—even more so than New York or Chicago—and dined at the Restaurant Copenhague.

Sept. 22—In Paris for the shopping and for the walks along the boulevards. For luncheon to the Café de la Paix and for dinner at the Ritz, which seems to me to be the best here available, notwithstanding the touts for all the little *cafés* that dot the back streets of the world's most beautiful city.

Sept. 23—In the elevator met Bob Levy, cardiologist, returning from the international congress in Brussels. For a visit to Delafresnaye at UNESCO, talking of the problems to come before the session. At dinner saw Artur Rubinstein, dean of the pianists, being tendered a party.

Sept. 24—To walk well-nigh the length of the Rue Faubourg Ste. Honoré and stopped with Mistress Pepys at des Granges, where she was fitted, and she says the rough woolen cloth is now what "they" are wearing, "they" being whoever is costing American men a fortune from year to year. In the evening with Domna Dontas to a cocktail party at the new home of UNESCO, which is decorated with a half-dozen Picasso murals which I do not understand. One, called "Good and Evil Striving for Man," seemed to show a reclining man, shaped like a balloon, on one side of a distorted skeleton; on the other side was a figure such as my granddaughter Amy Louise, age six, sketches at random. Here were Pommoloux and de Maystre of the WMA, Madame Zukhova of CIOMS, Tunbridge of Leeds, who is president of CIOMS, and many more for an interesting series of conversations. In the evening to dine at the Ritz, and here were Selman Waksman and his lady, returning from another series of lectures and conferences in Russia, and he told me of his invitation to India.

Sept. 25—All this day sitting in the extraordinary session of CIOMS, where a heated debate raged on whether or not to admit national organizations. Thalhimer, de Maystre and the International Dental Association led the opposition; although the bureau worked seriously, the vote of 15 to 9 in favor did not gain the necessary two-thirds majority. In the evening all to a beautiful reception at the home of Professor Robert Debré, who greeted us warmly and told beamingly how his son Michel Debré had just become Minister of Justice. Thereafter walking among the art shops and saw etchings of Picasso, now selling at about $250 each, signed by the artist; and one of the three plump damsels looking out a window was understandable.

Sept. 26—All the day at the CIOMS meeting, where the new constitution permitting associate members was adopted. Professor Maisin gave a fine report of the work accomplished, and Professor Debré spoke on organization of symposia, seminars, conferences and congresses and particularly of the need for assembling small groups of experts. In the evening to a reception by the *directeur* of the Department de Science Exacte et Naturelle of UNESCO at the Maison de l'Opera, and then with Mistress Pepys to glory in the view at

(Continued on page A-229)

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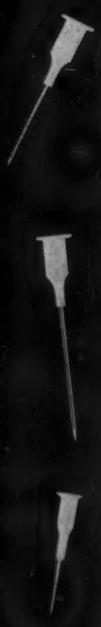
MEDICALLY TESTED PLASTIC HUB

A STERILE, NONPYROGENIC, NONTOXIC, B-D CONTROLLED NEEDLE



BECTON, DICKINSON AND COMPANY • RUTHERFORD, NEW JERSEY B-D

DISCARDIT, YALE AND B-D ARE TRADEMARKS OF BECTON, DICKINSON AND COMPANY

night from the Sacré Coeur in the Montmarte.

Sept. 27—With Mistress Pepys to walk among the book stalls on the Quai Voltaire and after luncheon to the Quai Michel to see etchings of Picasso, Matisse, Degas and Goya. Then past the old Faculté de Médecine, and looking into the shops showing medical books and instruments, the publishing house of Masson, the university press, and others on the Boulevard Ste. Germain. One wonders who buys all the etchings and what becomes of them. On the Boulevard Ste. Michel, the students in weird costumes—rich and poor, black, brown, yellow, white and, perhaps, a few red—pack themselves into the tables on the sidewalk, undoubtedly discussing the voting of tomorrow. In the evening with Ruth Hoffman and her fond mamma to Coq Hardi, with its astounding hydrangeas and thousands of roosters in every position and in every medium, to dine magnificently on melon, *canard d'orange* and a *soufflé* especially prepared for the occasion. Then up to Sacré Coeur in Montmarte, crowded not so much with tourists as with visibly amorous teen-agers.

Sept. 28—By the noon plane on BEA, which serves to first-class passengers sherry and Heidsiek champagne, to the London airport and again to Claridge's, best of hotels. Then walking along Bond Street, Piccadilly and Regent Street. St. James' is conducting a silver mile, soliciting a mile of coins for its rebuilding.

Sept. 29—At noon to the *Practitioner* for luncheon with Michael Fletcher and Sir Heneage Ogilvie. For some hours, the talk was all of publishing, and involved POSTGRADUATE MEDICINE, the *Practitioner*, *World-Wide Abstracts of General Medicine*, the *New England Journal of Medicine* and the *Journal of the American Medical Association*. And such talk is the delight of all of those who subsist on printers' ink. A South African practitioner took them to task on the use of the word "mitigate," which had slipped into the pages in place of "militate." In the evening to dine in the Causerie and there sat Rambar and his vivacious lady, and they were going also to see "Not in the Book," a comedy of crime, with shiver-producing situations, and a dozen laughs at a hard-of-hearing colonel. The play, with plots within plots, by Arthur Watkyn, is made into dramatic magic by the superb acting of a wonderful cast.

The Medical Muse

RICHARD ARMOUR

PSYCHIATRISTS

Psychiatrists who seek what's hid
In super ego, ego, id
Probe not with finger, wire or rod,
To find out what's a little odd.
The catheter they never use,
For it would bring up little news.
The knife they likewise scorn, for what
Is there of solid stuff to cut?
The x-ray, too, and fluoroscope
Are useless. So they have to grope
Around with words, and hope to hook
The lurking thought for which they look.

SURVEY

A government health survey reveals that women see physicians more often than men. Their rate is 5.5 times a year against 3.9 for men.—*News item.*

Are women more sickly, are women, then, softer,
That their trips to physicians are very much ofter?

Are women more worried? More free with their jack?
Or simply more eager to yackety-yak?

And men, are they healthy or merely more dumb?
More willing to suffer? More frightened to come?

Well, here are the figures, acquired with great pain,
But what they are good for, I cannot explain.